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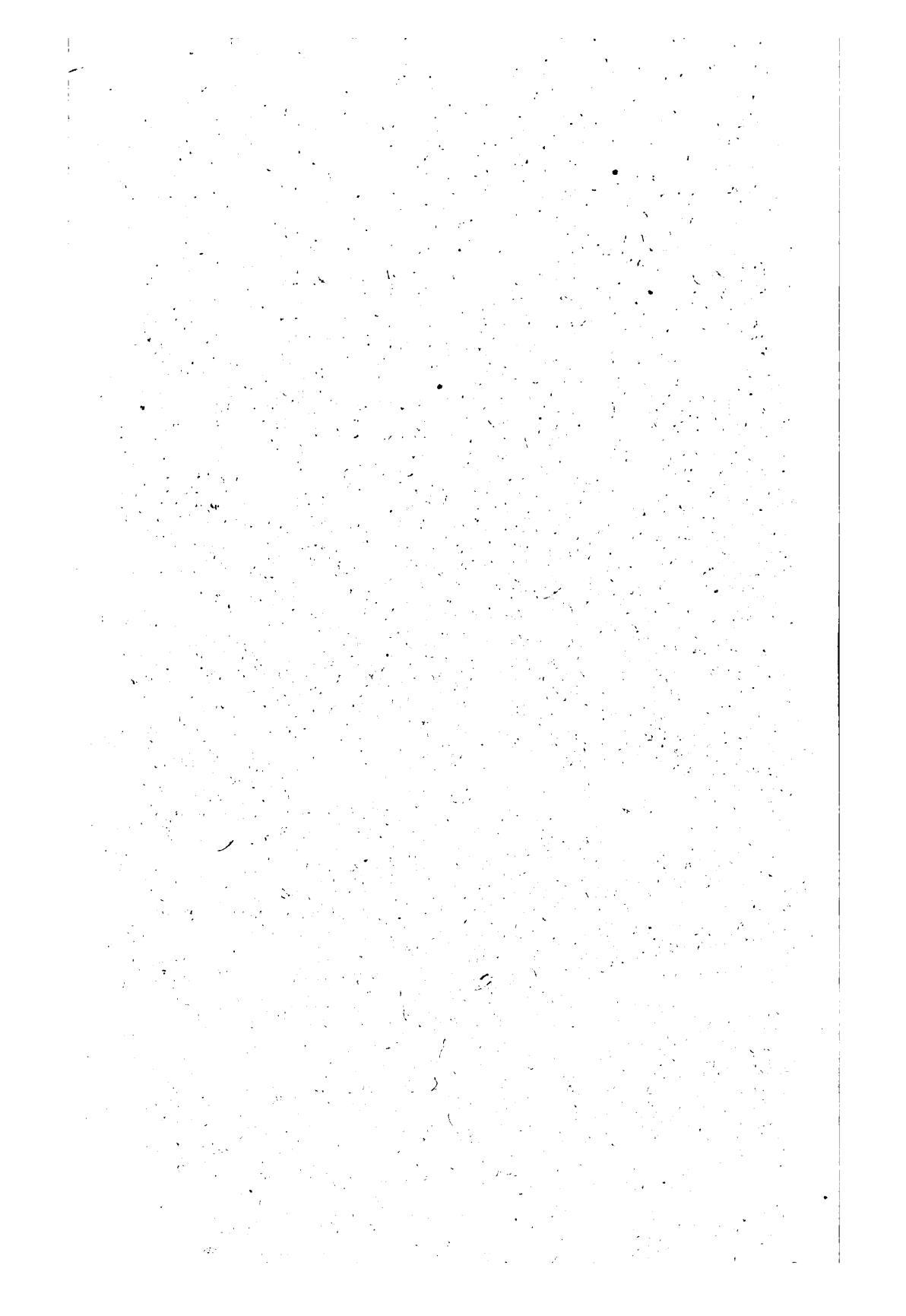

UNITED STATES OF BRAZIL.

A GEOGRAPHICAL SKETCH,

WITH SPECIAL REFERENCE TO

ECONOMIC CONDITIONS AND PROSPECTS OF FUTURE DEVELOPMENT.

COMPILED BY
THE BUREAU OF THE AMERICAN REPUBLICS.

WASHINGTON:
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NOTE.—"A List of Books, Magazine Articles, and Maps Relating to Brazil, 1800–1900," 145 pages, by P. Lee Phillips, F. R. G. S., Chief of Division of Maps and Charts, Library of Congress, is published separately as a supplement to this work.

BRAZIL.

CHAPTER I.

GEOGRAPHICAL SKETCH.

From many points of view the United States of Brazil may be compared with the United States of North America. From a geographical standpoint, for example, the two countries present a curious resemblance. Of enormous size, both occupy the central part of symmetrical continents, both are drained by mighty rivers, both are bordered on the east by narrow chains of mountains running parallel to the coast, and both are supported in the west by the great backbone of the New World. There is this difference, however, that the United States has an open route to the Pacific and controls its portion of the continent from one end to the other, while Brazil is bounded on the west by a series of Republics—Venezuela, Colombia, Perú, Bolivia, Paraguay, and Argentina. There is yet another difference: The great fluvial artery of the United States—the Mississippi—flows from north to south, emptying into the Gulf of Mexico and dividing the country into two distinct parts, while in the fluvial system of Brazil the principal rivers rise in the plateaus of the interior, where their head waters frequently interlace. Thence they diverge in the form of a fan and flow in courses more or less sinuous toward the east coast. This unique arrangement will not only facilitate, in the future, communication between extreme points of the country, which is now made by ocean route, but will hereafter be of extraordinary value to the commercial cities of the Atlantic coast by making them outlets for the products of the Andine countries.

Brazil has a coast line nearly 6,500 kilometers in length, extending from the mouth of the Oyapok River and Cape Orange, in latitude 4° 20′ 45″ north, to the mouth of the Chuy River, in latitude 33° 46′ 10″ south.

The boundary with French Guiana, which had been in dispute with France since the latter part of the seventeenth century, has been recently settled by the award of the Swiss Federal Council to which it was submitted. The award was rendered on the 1st of December, 1900, and states the following:

"1. That the Japoc, or Vincente Pinçon, of article 8 of the treaty of Utrecht is the Oyapok that debouches to the west of Cape Orange, as has been established by the documents which Brazil has submitted

to the tribunal, and that the thalweg of that river, from its mouth to its source, definitely constitutes the first of the frontier lines between Brazil and French Guiana.

"2. That the other frontier line, from the source of the Oyapok to the point of junction with the Dutch territory, will be that which article 2 of the treaty of arbitration indicated as an intermediate solution—that is to say, the line of division of the waters in the Tumuc-Humac Mountains forming the northern limit of the Amazon basin."

The extreme northern point of Brazil, however, is in the interior of the continent at the point of convergence of the boundaries of British Guiana and Venezuela, in latitude 5° 9′ 50″ north, and in longitude 17° 43′ 20″ west, reckoned from the meridian of Rio de Janeiro. The distance from this point to the mouth of the Chuy River is about 2,700 miles. Its greatest width from east to west is comprised between a point in the State of Pernambuco, in longitude 8° 23′ 30″ east, and a point on the frontier of Perú, on the Javary River, in longitude 30° 58′ 26″ west (meridian of Rio de Janeiro), the distance between these two points being approximately 4,350 kilometers.[1]

Southward from Cape Branco the Brazilian coast line, which up to this point advances toward the east, again recedes, forming at this point almost a right angle. Also southward from the point on the Javary River the territory of Brazil gradually diminishes in width, first making way for Bolivia, then following the outline of the continent and ending, after being pressed by Paraguay, Argentina and Uruguay, in the State of Rio Grande do Sul. This latter State would have been almost separated from the rest of Brazil if Argentina had realized its pretentions over the territory of the Missions, which, like a wedge, entered in the States of Santa Catharina and Paraná. After a prolonged controversy and extensive negotiations the disputed territory was awarded to Brazil in 1895 by the decision of President Cleveland.

The boundaries of Brazil with some of the neighboring countries, are not yet definitely settled. With British and Dutch Guiana diplomatic negotiations are pending.[2] The Colombian controversy is enhanced by the claims of Venezuela, Ecuador, and Perú to portions of the disputed territory. The diplomacy of the Empire fixed the boundaries with Venezuela (1869), with Peru (1851, 1858, 1877), with Bolivia (1867), with Paraguay (1872), and with Uruguay (1851, 1852, 1857); but in some cases, as in that of Bolivia for example, the boundary line has not yet been definitely settled, notwithstanding that a commission has had the matter in charge for some time.

The total area of Brazil is about 8,337,218 square kilometers. In area, therefore, Brazil comes immediately after Russia, China, the

[1] E. Levasseur et Rio Branco, Le Bresil, Paris, 1889, pp. 1–2.

[2] Report of minister of foreign relations for 1897.

British Empire, and the United States; Siberia being included in the former and Alaska in the latter, and occupies nearly one-half (45 per cent) of the South American continent.

The following table shows the area and population of the country by States for 1872, the first regular census of Brazil, compared with the latest official reports for 1890, when the second census was taken.[1]

States.	Area.	Population.		Population square kilometer, (census, 1890).
		Census, 1872.	Census, 1890.	
	Sq. kilometer.			
Alagoas	58,491	348,009	648,009	.09
Amazonas	1,897,020	57,610	207,610	9.1
Bahia	426,427	1,379,613	1,683,141	.2
Ceará	104,250	721,686	881,686	.1
Espirito Santo	44,839	82,137	382,137	.1
Goyaz	747,311	160,395	260,395	2.8
Maranhão	459,884	359,010	459,040	1
Matto-Grosso	1,379,651	60,417	170,417	8
Minas Geraes	574,855	2,039,735	3,009,023	.1
Municipality of Rio de Janeiro	1,394	274,972	674,972	.002
Pará	1,149,712	275,237	859,821	1.3
Parahyba	74,731	376,226	382,587	.1
Paraná	221,319	126,722	626,722	.3
Pernambuco	128,395	841,539	1,101,539	.1
Piauhy	301,797	202,322	202,322	1.04
Rio de Janeiro	68,982	782,724	1,227,575	.05
Rio Grande do Norte	57,485	233,979	313,979	.1
Rio Grande do Sul	236,553	434,816	880,878	.2
Santa Catharina	74,156	159,802	250,802	.2
São Paulo	290,876	837,354	1,637,354	.1
Sergipe	39,090	176,243	461,307	.09
Total	8,337,218	9,930,448	16,330,216	1.19

Divided by sexes the two censuses show:

Year.	Males.	Females.	Total.
1872	5,123,869	4,806,609	9,930,478
1890	7,237,932	7,095,983	14,333,915

The increase in the eighteen years has been 4,403,437, equivalent to 443 per 1,000, or 24.6 per 1,000 annually.

Notwithstanding its geographical unity, Brazil, on account of the vast extent of its territory, is divided into large and distinct regions.[2]

[1] The census of 1890 was not very accurate, and it may be said that a large portion of the population was not counted. The present population of the Federal capital, according to the Boletim Trimestral de Estatistica Demographo-Sanitaria No. 4, for the last quarter of 1900 was 779,000. The capital of the State of São Paulo, according to a similar official publication of the State, amounted to 260,000 on the 31st of July, 1900. At the same rate of increase of population which is shown by comparison in the two reported censuses, the present population of Brazil could be safely estimated at over 20,000,000, not mentioning the natural increase due to immigration, which during the last ten years has been larger than during the whole history of the country.

[2] Elise Reclus, Nouvelle Geographie Universelle, Vol. XIX, p. 14.

First in extent and natural resources is the region known as Amazonia, which embraces one-half of the Republic, its principal feature being the majestic river from which it derives its name. After leaving the Andes the Amazon follows an impetuous course, due to the great volume of its waters rather than to the velocity of its current, and after receiving a large number of affluents empties into the Atlantic, which it freshens for a distance of about 60 leagues.

Between this region and the basin of the São Francisco the territory extends far out into the ocean, and is occupied by the States of Maranhão, Piauhy, Ceará, Pernambuco, and Alagôas, being separated from the interior by a semicircle of plateaus bordered by mountains, beyond which and the São Francisco basin lies the land of Goyaz, drained by the Araguaya and Tocantins rivers, which flow north and together empty into the Atlantic near the Amazon. Farther beyond is the territory of Matto-Grosso, where rise numerous rivers, some flowing into the Amazon, others into the estuary of the River Plate, while others fertilize the land and feed the mighty rivers of the two systems.

South of the São Francisco River, bordered on the west by the great mountainous group of Brazil, are the two rich States of Minas Geraes and Bahia, famed for their mineral and agricultural wealth, and which constitute geographically part of the basin of this most important river. The sources of its western affluents almost mingle with those of the tributaries of the Tocantins and of the northern affluents of the Paraná. The latter river, after receiving the waters of the Paraguay, whose sources are in the center of Matto-Grosso, near those of the Tapajos, an affluent of the Amazon, empties into the estuary of the River Plate. Rio de Janeiro is the last of the coast States which form a part of the basin of the São Francisco. These States present a different aspect from the northern maritime States. The mountain ranges are nearer the coast line, the rivers are more rapid, the flora richer, and the climate less healthy.[1]

The southern part of Brazil, from the State of Rio de Janeiro to Rio Grande do Sul, lengthens out, making way for the pampas of Argentina.

In respect to orography, Brazil can not be considered either essentially a mountainous or a level country. Along the coast the land is generally low and largely covered with forests and is succeeded by enormous plateaus which gradually rise toward the interior. North of the Amazon the region of Brazilian Guiana consists of highlands covered with virgin forests, occasionally intersected by vast prairies and isolated mountain peaks.[1] The Amazon region is an immense plain broken by low hills, with a declivity so slight that at a distance of 3,000 kilometers the river is only 140 meters above sea level. This

[1] E. Levasseur et Rio Branco, op. sup. cit., p. 5.

vast plain unites with that of the Orinoco in the north and that of La Plata basin in the south, being joined to the latter by the valleys of the Madeira and the Guapore rivers. The mountainous region in the interior of Brazil has an area of nearly 4,500,000 square kilometers and an altitude varying between 500 and 1,000 meters. This group of mountains has a number of side ramifications along the coast. "The highlands of Brazil are made up of broad plains and deep valleys. The mountains of Brazil due to volcanic action are in the east and center, consisting of two chains almost separated by the high plateaus of the São Francisco and Paraná basins and reunited by the transversal ridge extending across the southern part of Minas Geraes and forming part of the great watershed of the South American continent."[1]

The river system with which Brazil is endowed is most remarkable. The two great rivers, the Amazon and the Paraguay, offer uninterrupted navigation throughout their course, they being preeminently rivers of the lowlands. The tributaries to these, and the other water courses of Brazil in general are, however, rivers of the highlands and only their upper and lower portions are navigable. The difference in altitude between the highlands and the coast of the lowlands is 100 meters or more, and the descent is effected by a series of falls and rapids situated at a comparatively short distance from their mouths. The most notable of these are the falls of Paulo Affonso in the São Francisco River, and of Sete Quedas in the Paraná.

The tributaries of the upper Amazon, above the Rio Negro on the north and the Madeira on the south, offer an exception to this rule. The descent from the plateaus whence they rise being made in the upper part of their course, they are navigable for long distances. Of the rivers which empty directly into the Atlantic those of the State of Maranhão and the Parnahyba offer the best navigation facilities, as they rise at a lower level, making a gradual descent to the ocean, instead of by one or more series of rapids.

The State of Matto-Grosso has been called the heart of Brazil, for the great arteries which carry life to the remotest parts of this vast country start from here. The head waters of the Guaporé, principal affluent of the Madeira, near Villa Bella, are only a few hundred meters from the rivulets Aguapey and Estiva, which empty into the Jaurú, an important tributary of the Paraguay. By means of a small canal which the Portuguese attempted to cut in the last century, a flat-bottomed boat might pass from the mouth of the Plata to the mouth of the Amazon through the rivers of this unique system.

The hydrographic system of Brazil may be divided into seven groups or classes, as follows: (1) The rivers north of the Amazon,

[1] Moreira Pinto, Chorographia do Brazil, Rio de Janeiro, 1892, p. 15.

watering the territory bordering the Guianas; (2) the Amazon basin, which not only receives the waters of its numberless affluents, but also drains the plain of the Amazon; (3) the watershed of the northeast, between the Amazon and the São Francisco; (4) the São Francisco basin; (5) the river system between the latter and the Parahyba do Sul; (6) the water courses between the latter and the southern frontier, and (7) the Plata basin.[1]

To the first group belong such rivers as the Oyapok, Cassiporé, Counani, Macapá Grande, Calçoene, and Araguary, with their respective affluents.

The Amazon basin measures an extent of 7,000,000 square kilometers, but Brazil does not possess either the Andean region where it rises, under the name of Marañon, or some of its principal affluents in that region, such as the Ucayali and Huallaga. The Amazon enters Brazilian territory at Fort Tabatinga, beyond the confluence of the Javary, where it measures 2,770 meters in width. About 3,200 kilometers out of an extent of 5,600 belong to Brazil, and during its course numberless affluents increase its volume, the principal being the Içá or Putumayo, navigable for steamboats for about 2,000 kilometers; the Rio Negro, Rio Branco, Tacutú, Urubú, Javary, Jundiatiba (navigable for about 800 kilometers), the Madeira, about 9,900 kilometers in length from its source to its point of emptying into the Amazon; the Guaporé or Itenez, 1,500 kilometers long; the Rio Verde; Mamoré; Tapajóz, 1,800 kilometers; Xingú, 2,000 kilometers; Tocantins, 2,600 kilometers, and the Araguary, 1,800 kilometers, with their affluents.

The principal rivers belonging to the third group are the Gurupy, Nearim (1,100 kilometers), Itapicurû (1,600 kilometers), Parnahyba (1,700 kilometers), and their affluents. To the fourth group, or the São Francisco basin, belong the São Francisco, one of the most important rivers of South America, 9,200 kilometers in length; Paracatú, Rio Pardo, Rio Verde, Carinhanha, Rio Grande, and their affluents. The fifth group contains the Itapicurû, Vasa Barris, Paraguassû, Contas, Patype, Belmonte or Jequitinhonha (1,080 kilometers), Mucury, and several others and their respective affluents. The Parahyba do Sul is the most important river of the sixth group, besides the Macahé, São João, Guandú Mambucába, Cubatão, and several others. The seventh group, or the Plata basin, contains an area of 3,500,000 square kilometers, the eastern portion of which belongs to Brazil, where the head waters of the principal rivers of this basin are found, viz, the Paraná, Paraguay, and Uruguay, and their principal affluents.

[1] The river system of Brazil is of such enormous size that, notwithstanding its importance, it is impossible to treat of it at length within the limits of this work, as it would require a space that would make this a voluminous book. A good map of the country will give a more accurate idea of the Brazilian hydrography.

Reclus[1] gives the following synopsis of the river system of Brazil:

	Extent.	Basin.	Distance navigable by—	
			Steamers.	Boats.
	Kilometers.	*Square kilometers.*		
Marañon	2,400	1,000,000	1,450	1,800
Northern affluents:				
Içá	1,645	112,400	1,480	1,600
Japurá	2,800	310,000	1,560	2,500
Rio Negro	1,700	715,000	728	1,100
Trombetas	870	123,500	450	500
Southern affluents:				
Javary	945	91,000	800	900
Jurahy	650	38,000	500	600
Juruá	2,000	240,000	1,500	1,825
Purús	3,650	387,000	1,800	2,500
Madeira	5,000	1,244,000	1,060	1,700
Tapajoz	1,990	490,500	350	1,400
Xingú	2,100	395,000	120	1,500
Amazon	5,800	5,594,000	5,200	5,650

Two-thirds of the frontiers of Brazil are formed by seacoast, which offers a large number of harbors in addition to that of Rio de Janeiro, the most beautiful and spacious bay of the world. The following are the most important: Pará, on the Bay of Guajará; Maranhão, on the Bay of São Marcos; Fortaleza, in Ceará; Recife and Tamandaré, Pernambuco; Maceió, Alagôas; São Salvador, Ilhéos, and Cabralia, Bahia; Santos, São Paulo; Paranaguá and Antonina (Paraná), Santa Catharina. These harbors admit vessels of more than 6 meters draft.

Brazil has none of the great lakes characteristic of North America, but it has an infinite number of small ones, the largest of which is Lagôa-dos Patos, 200 kilometers long and 60 wide, situated in the extreme southern part of the Republic, in the State of Rio Grande do Sul. The States of Rio Grande do Sul, Amazonas, and Alagôas contain the largest number of lakes.

The principal island is that of Marajó, situated in the mouth of the Amazon River. It is 300 kilometers long, 220 wide, or 5,238 square kilometers in area, and contains rivers that are navigable for a distance of over 100 kilometers. Other islands deserving of mention are those of Maranhão, which contains the capital of the State, San Luis, originally a French settlement; Itamaracá, after which was formerly called the captaincy adjoining that of Pernambuco; Itaparica, in the Bay of Todos os Santos; Governador, the largest of the 100 islands contained in the Bay of Guanabára, and Santa Catharina, containing Desterro, the capital of the State. These islands lie very near the coast. The island of Fernando de Noronha is situated far out in the ocean at a distance of 75 leagues from Cape São Roque, and belongs to the State of Pernambuco by the decision of the federal senate. Prior to the Republic this island was made a penal establishment for the convicts of the country. Near by are the Rata

[1] Opus cit.

Islands, which contain large deposits of guano. Farther to the south, off the State of Espirito Santo, and at a distance of 1,150 kilometers from the coast, is the island of Trinidad, which England endeavored to seize in order to establish there a cable station. Brazil, however, made a vigorous protest, and it was finally restored to it through the good offices of Portugal, for this country, during its sovereignty in America, had erected a fortress there, and was positive, therefore, that the island lawfully belonged to Brazil.

Geographical position, formation of soil, richness in water, rock formation, the condition of vegetable growth are, generally speaking, the determining factors of the climate of a country, but in many cases, and so it is in Brazil, other circumstances exert a great influence. Thus in that Brazilian territory which stretches through several zones there are found a number of extraordinarily irregular isothermen (lines of temperature). In one and the same season the most varied air currents are to be observed, for which it would be difficult to apply any rules so far as any particular point is concerned. One can hardly speak properly in a general way of a Brazilian climate, although when the extent of the country is considered, the climate of the several States, with the exception, perhaps, of those on the equator, has the peculiarity of warmer districts. Henri Morize, of the Observatory of Rio de Janeiro, makes a distinction between a tropical zone, to which belong the States of Pernambuco, Parahyba, Rio Grande do Norte, Ceará, Piauhy, Maranhão, Pará, and Amazonas; a temperate one, to which belong the upper parts of the States of Paraná, Santa Catharina, and Rio Grande do Sul, as well as the larger portions of the State of São Paulo; and the warm zone, which embraces the other parts of the middle States of southern Brazil. Northern and central Brazil have, at all events, a continued higher temperature than southern Brazil, while in the east the ocean has its effect upon the temperature, which naturally has less influence upon the westerly division. Snow and ice are rare, appearing only seldom in the mountainous regions, and have no effect upon organic life.

In the colony of Blumenau, State of Santa Catharina, on one occasion, in the year 1863, there were 3° C. during the night, and in St. Leopoldo, Rio Grande do Sul, there were several centimeters of snow in June, 1861. In 1859 a snowstorm near Lages, in Santa Catharina, caused the death of 30,000 animals. On the mountains of Itatiaia there are frosts as high as 3°.2 C. below zero. Between Ouro Preto and Barbacena (Minas Geraes) the temperature sank during five or six days in June, 1870, to 4° C. below the freezing point. The several mean temperatures at points in thirteen Brazilian States are given by Santa Anna Neri in his work upon Brazil, published in 1889, as follows: Maranhão, San Luiz de Maranhão, 27°.4; Pará, Fortaleza, 26.°6; Ceará, Quixeramobim, 29°.3; Rio Grande do Norte, Amarante, 27°.1; Pernambuco, Recife, 26°.2; Espirito Santo, Colonia Izabel, 23°.7;

Colonia da Victoria, 25°.1; São Bento das Lages, 24°.8; Bahia, Bahia, 26°; Minas Geraes, Queluz de Minas, 19°.9; Ribeirão Preto, 20°; Rio de Janeiro, Nova Friburgo, 17°.2; Santa Cruz, 22°.2; Rio de Janeiro, 23°.5; São Paulo, Casa Branca, 23°.5; Cascata, 18°; Paraná, Coritiba, 17°.9; Santa Catharina, Colonia Blumenau, 21°.4; San Antonio da Palmeira, 18°; Rio Grande do Sul, Colonia Nova Petropolis, 19°.1; Colonia Santa Cruz, 19°.2; Passo Fundo, 17°.1; Taquary, 18°.7; Pelotas, 17°.2, and Rio Grande do Sul, 18°.8.

The greatest difference between warmth and cold is to be found along the Amazon (12° C.) in Ceará, Rio Grande do Norte, and in the southern high and low lands of the State of Rio Grande do Sul. The tropical forests of Brazil have an even, humid warmth, as have also the river valleys in the interior. The humidity of the atmosphere is generally more trying than even the intense heat, and very destructive to everything. From Rio de Janeiro to Amazonas in the tropical zone there is a mean temperature of 26° C. Princess Theresa, of Bavaria, says, "The yearly mean temperature is 28° C. in Amazonas." Starting from the capital city to the extreme south of the Republic, the heat becomes gradually less. The seasons are spring, summer, autumn, and winter, and divided on the calendar as in the United States, but in ordinary life the only distinction is that of the dry and wet season. The beginning of the latter varies in the southern States—as a rule in October—and its duration is from four to six weeks, without abatement. In the vicinity of Pernambuco it rains from April to June. In Rio de Janeiro the rainy season was formerly regular between November and March, but since the destruction of the forests there is no certainty as to its appearance. In the interior the rainfall is somewhat late—seldom earlier than in December. The rainy season continues from January to May and the dry from May to December. In the vicinity of Pará and on the upper Amazon there is absolutely no regularity—it rains at all times. The ever-present wind currents are responsible for this, and they bring to the country the necessary humidity in such parts where the river tributaries are limited in their extent. The continued rains are not feared as much as the drought, which often appears in the vicinity of Ceará, Pernambuco, Piauhy, Parahyba, and Rio Grande do Norte. The yearly mean rainfall on the coast is given at 2 millimeters and often more.

On the Amazon it is accepted that there is a yearly rainfall of 1,300 to 2,000 millimeters. Exact measurements have been sparingly made, and there remains much to be done in the investigating of the weather conditions. The reason is that most travelers see but a small portion of the country. The wind currents are of a special influence along the coast. Southeast and north winds exist practically during the whole year from Cape Orange as far as Rio Grande. The penetrating northeast wind commences in September and lasts until March. The southeast wind continues through April to August.

Between Cape St. Roque and the mouth of the Amazon the southeast wind continues the whole year, but is strongest between October and March. In the vicinity of the coast the wind off the land is from 4 to 9 o'clock a. m. and from the sea in opposite direction from 10 a. m. to 6 p. m. The wind currents vary according to the nature of the country, and in the flat districts naturally make themselves felt more than in the mountainous parts of the coast region. The southwest winds in southern Brazil (pamperos) are often very disastrous to shipping. They get their name from the pampas through which they take their course, and at times of great heat suddenly sweep across sea and land, continuing for days and driving myriads of insects before them. In the basin of the Amazon, which is almost free of mountains, the east winds, especially from July to November, reach a distance of 3,300 kilometers into the interior. In this season sailing craft make their journey with great ease far into the interior. In the interior of Brazil, far from the coast, the south winds prevail in winter and the north in summer.

The following meteorological statistics were obtained from the museum of Pará for the year 1897:

	° F.
Mean maximum temperature	87.6
Mean minimum temperature	71.9
Mean temperature	79.8
Maximum temperature	91.2
Minimum temperature	67.6

The results given below are taken from temperature statistics published by the assistant calculator of the Imperial Observatory at Rio de Janeiro:

Maximum and minimum annual shade temperatures.

Year.	Maximum.		Minimum.	
	Date.	° F.	Date.	° F.
1880	Jan. 27	99.50	July 1	56.66
1881	Dec. 9	94.46	Aug. 6	56.66
1882	Nov. 27	96.06	Sept. 1	50.36
1883	Nov. 25	99.50	Aug. 19	55.22
1884	Jan. 12	98.96	Sept. 16 Oct. 7	58.10

Mean temperature.

	° F.
1851–1867	74.48
1868–1878	75.02
1879–1884	73.04

The ordinary diseases which afflict humanity everywhere are found here. Intermittent and malarial fevers prevail in the low, marshy lands along the coast, while at Rio de Janeiro and Santos there are outbreaks every summer of yellow fever, which was introduced in 1849, having been brought from New Orleans. Other ports along the

coast are occasionally visited by this scourge through contagion. The problem of the extinction of the yellow fever in these two cities where it generally prevails, has been repeatedly studied, and it is natural to suppose that with a better system of drainage, the removal of *morros* to permit the free circulation of air in the old part of the city, and the adoption of other sanitary and preventive measures, it may be practically eradicated, or at least reduced to rare appearances as at New Orleans.

The fauna of Brazil is very rich, especially in birds and insects, of which it has some unique and remarkable specimens. Mammals are less abundant and the ferocious species, which are peculiar to the Old World and still render the exploration of the African continent so hazardous, are unknown. The most terrible of the mammiferous is the ounce or jaguar (*Felis onça*), a species of the tiger, having a spotted instead of striped skin, and of which there are four varieties in Brazil. The largest and most powerful mammal is the anta or tapir (*Tapirus americanus* or *suillus*). The forests abound with monkeys, wildcats, or "maracajas" (*Felis pardalis*), foxes (*Canis brasiliensis*), guaninim (*Procyon cancrivorus*), wolves, etc. In the way of game there are deer, *queitatús*, a species of wild hog (*Dicotyles torquatus*), *Tatús* or armadillos (*Priodonta, tatusia*), tamanduás (*Myrmecophaga*), guinea pigs (*Coelogenys*), capyvaras, a species of otter (*Hydrochoerus*), cutias (*dasyprocta agouti*), rabbits, hares (*Lepus brasiliensis*), etc.

The destruction of game at all seasons of the year and the lack of restrictive regulations and municipal ordinances have resulted in greatly reducing those species peculiar to Brazil. The domestic animals introduced from Europe have increased in number, especially the working animals.

As to the aquatic mammals, whales and *botos* (*Delphinus rostratus*) are found along the coast and dolphins (*Platanista amazonica*) in the Amazon.

The birds of most brilliant plumage are parrots (*Conuridæ*), macaws, *toucans* (*Ramphastida*), and many varieties of humming birds (*Trochilidæ*). The sweetest song birds are the *sabiá* (*Mimus lividus*), *patativa*, *curió*, *chechéu*, etc. Game birds abound, such as the *mutúm* (*Crax-alector*), partridge (*Tynamus brasiliensis*), *jacú* (*penelope*), turtle dove, *nambú*, and others. Many of these birds, and especially those of the finest flavor, such as the heron (*Ardea pileata*), *socó*, *jaçanã*, *marreca*, and other varieties of the duck, are found along the banks of the streams and in the marshes. Other birds are the American ostrich (*Myrmecophaga jubata*), *seriema* (*Palamedea cristata*), *jacami* (*psophia*), etc.

In the streams and along the coast abound excellent fish, especially the salt-water varieties, such as the *garoupa*, mackerel, turbot, *bejupirá*, corbina, *sióba*, etc. Of the fresh-water fish the best known are

the *jundiá*, *traira*, *camorim*, *curimam*, *pirarucú*, *puragué*, and *gymnoto*, or the electric eel, the latter being found in the Amazon. Crustacea, lobsters, crabs, etc., abound as well as mollusca, oysters, cockles, etc., and batrachia, frogs, *gias* (*Ceratophrys cornuta*), etc.

Reptiles are abundant, and there are many poisonous species. In the forests and along the streams are found the boa constrictor, anaconda, rattlesnake (*Crotalus horridus*), *jararáca* (*Trigonocephalus*), *surucucú* (*Lachesis mutus*), etc. Alligators are numerous along the banks of the large rivers. The turtles of the Amazon (*Testudo midas*, *coryacea*, etc.) are remarkable for their size and abundance, their eggs constituting an excellent food.

In insects there is an immense variety, as may be seen from the fact that a single family (Longicornes) has 489 species native to Brazil. The butterflies are unsurpassed for beauty, and the bees furnish a delicious honey. The ants, previous to the introduction of ant powders, were the plague of the agriculturists; along the coast and in the marshes abound spiders, mosquitoes, and other insects of this class, although they are far from being as numerous and poisonous as those of other tropical regions.

It is well known that the flora of Brazil is one of the most beautiful in the world.[1] Not only does it present all the luxuriance and variety common to the flora of hot countries, but it has also its own peculiar specimens, giving it an extraordinary splendor, especially in the equatorial region of the Amazon. The vegetation along the banks of this majestic river is different, however, from that of the highlands. In the region which is periodically submerged for months, the plants almost equal the palms in height, having bare trunks, crowned by an abundance of dark green foliage. On the surface of the river the *Victoria Regia* displays its gigantic leaves and flowers. In the region beyond the floods the trees attain a height of 60 and 65 meters and are covered with vines and parasites. Fruit trees, medicinal plants, cabinet woods, dyewoods, etc., are all found in these wonderful forests, together with the *seringueira* (*Siphonia elastica*), which distils the precious rubber which constitutes the wealth of the Amazon region. At the Chicago Exposition the State of Amazonas exhibited 441 kinds of woods, a catalogue of which has been published; but the *Indice Geral* of the woods of Brazil, published by André and José Rebouças in 1876–78, comprising three volumes of 300 pages each, gives no less than 22,000 species, ranging from the ornamental plants, ferns, etc., whose variety is infinite, to the *sumaumeira* (*Eriodendron suamauma*) which in size rivals the *Washingtonia gigantea* of California.

Maury, in his work above referred to, says that the flora of the coast zone, comprised between Pernambuco and Rio de Janeiro or São Paulo, though characteristic, resembles in richness that of the

[1] Paul Maury—La flore op. sup. cit. by Levasseur and Rio Branco, p. 15.

equatorial region. Along the coast grow the bushy mango trees, and on the sides of the mountains the great tree ferns. The *Carnaubeira* is a species of the palm tree distinctive of a certain zone between Pernambuco and Maranhão—most useful to the people, as it yields honey, wax, wood, and a strong fiber. Pine groves, composed of the *aranca-ria brasiliensis*, clothe the mountain slopes, comprising the principal vegetation from Minas Ceraes to Rio Grande do Sul. In the plateaus of the interior grazing lands generally prevail, in contrast to the luxuriant wooded districts of the other sections of the country. The valleys are succeeded by meadows covered by underbrush and interspersed with *capœiras*. In the vast plains of Matto Crosso, between the Paraná and Paraguay rivers, and extending into the Chaco and through Bolivia to the Andes, the equatorial flora of the Amazon is reproduced. This is known as the region of marshes. Tropical forests border the streams and surround the immense marshes of those plains.

The geological structure of Brazil is far from being thoroughly known. It only began to be systematically studied after fossils had been discovered and the identification and classification of the formations began to be sustained by paleontology, first regularly studied by Professor Hartt and his colleagues.

Ancient metamorphic crystalline rocks form the base of the great Brazilian plateau and constitute nearly all the mountains, standing out isolated wherever the plains have been extensively denuded. These rocks belong principally to the series of gneisses, granites, diorites, etc.—that is, to the primitive formations—and contain many gold-bearing deposits, precious stones, and iron.

According to Henrique Gorceix[1], director of the School of Mines at Ouro Preto, the other formations are as follows:

"*Paleozoic.*—Paleozoic, Silurian, Devonian, and Carboniferous formations are encountered in the lower part of the Amazon and its affluents, the Xingú, Tapajóz, etc. The valleys are of marine formation. The predominating rocks are schists, gray sandstones, and clays. Calcareous rocks are found in the upper part of these streams.

"*Cretaceous.*—The Trias is but little known. Cretaceous rocks cover a vast area of the States of Ceará, Piauhy, Pernambuco, Sergipe, and Alagôas.

"*Tertiary.*—The Tertiary formations cover the banks of the lower Amazon and occupy a narrow strip along the coast from the mouth of the Amazon to the State of Espirito Santo. They consist almost entirely of gray rocks. In the interior—in Minas Ceraes, for instance—these formations are represented by small lacustrine deposits containing lignite.

"*Quaternary.*—To this group belong the superficial deposits of

[1] Levasseur et Rio Branco, opus cit., p. 7

clays, gravels, and conglomerates which are scattered in fragments over the plateaus and in the valleys, as well as the clayish deposits of certain calcareous caverns of Minas Ceraes and Bahia, which have yielded the remains of a number of extinct mammals studied by Lund. This division also includes the deposits of diamond-bearing alluvia in Minas Ceraes, Bahia, Goyaz, and Matto Grosso.

"At the close of the Paleozoic period a large part of Brazil was upheaved, and during the subsequent geological periods its general structure suffered but little change. The dislocations which have affected these various formations have produced, as in North America, great parallel folds of strata with numerous fissures and anticlines."

The study of paleontology has kept pace with that of geology. In 1887 Dr. White[1] published a memorial on the mollusks and echinoderms, or the marine fauna of the Cretaceous period, which in its Gastropoda is said to resemble the analogous fauna of southern India and in its Cephalopoda to show considerable affinity with the contemporaneous fauna of New Mexico. The fauna of earlier formations of the Paleozoic, and especially of the Carboniferous periods, is almost identical in the two Americas. In Ceará and Piauhy the fauna of the Cretaceous period is very rich in fish.

But little is known of the fauna of the Tertiary period, as the deposits are almost entirely marine and contain few fossils. It is probable, however, that the fauna of the vertebrates of the Tertiary period reaches from Patagonia and the Argentine to western Brazil. In the opinion of Dr. Troussart,[2] the Quaternary fauna, which Lund discovered in the caverns of Minas Ceraes, is nothing more than the remains of the South American Tertiary fauna. It is very much richer than the present fauna. In it have been found, in addition to nearly all the mammals now living in Brazil, two monkeys of extinct species, *Protopithecus brasiliensis* and *Jacchus grandis;* carnivorous animals of great size and strength, *Smilodon neogœus* or *populator*, *Canis pacivorus*, *Ursus brasiliensis*, etc.; ruminants, such as the llama (*anchenia*) now existing in the Andes; deer of extinct species; mastodons; several species of horse (*equus*) and an allied genus (*hippidium*). Finally we have in the Quaternary fauna of Brazil the colossal edentates *Megatherium*, *Platyonyx Cuvieri*, etc., and the gigantic armadillos (*Glyptodontes*), all of which are extinct types.

Brazil was colonized almost entirely by the Portuguese, who united on a large scale, first with the Indian and later with the African element. The fusion with the Indian took place in the sixteenth century, while the black or African fusion occurred in the seventeenth, eighteenth, and nineteenth centuries, when a great part of the popu-

[1] Contribuições á Paleontologia do Brazil. (Archivos do Museo Nacional do Rio de Janeiro, Vol. VII, 1887.)

[2] Levasseur et Rio Branco, opus cit., p. 19.

lation of Brazil, with the exception of the upper or educated classes, became *mestiço*. The Indian was warlike and rebellious, so that the fusion with this element was very much less. By receding farther and farther from civilization the Indian has at last almost disappeared from Brazil, and to-day is found only in the interior and along the banks of the Amazon and its tributaries. Its population at present is estimated at about 600,000. The negro, docile and subservient, was employed in the home, on the plantation, and in the mines, and the Portuguese immigrant very naturally united with this element. When the abolition of slavery occurred, in 1888, there were only about 740,000 slaves.

The increase of population in Brazil has been rapid, and due to large birthrate rather than to foreign immigration, which was almost entirely prohibited during the colonial period, and in more recent times has been opposed by slave labor and other causes. In anticipation of the complete extinction of slavery, immigration increased greatly during the last twenty years, as may be seen from the following data.[1]

The number of immigrants from 1804 to 1892 was 1,327,021. First period, from 1808 to 1854, 140,000, or 3,000 per year; second period, from 1855 to 1885, 498,115, or 16,066 per year; third period, from 1886 to 1892, 688,906, or 98,415 per year.

The extent of territory of Brazil, the separation of its centers of population, lack of communication, and ignorance of the lower classes are an obstacle to obtaining reliable statistics of the population. However, it is known that at the close of the sixteenth century the colony had scarcely more than 60,000 inhabitants, while at the end of the eighteenth century it already comprised nearly 3,000,000. Shortly before the independence of Brazil (1819) the population increased to 4,000,000. At the time of the majority of Dom Pedro II (1840) the total population had reached 5,000,000; after the war with Paraguay, which cost Brazil so many lives (1872), it amounted to nearly 10,000,000, and at the time of the proclamation of the Republic (1889) to 16,330,216.

The population of Brazil is very unequally distributed, both from the standpoint of geographical position as well as of race predominance. Brazil was not populated from the east to the west—that is, from the seaboard toward the interior—but along the coast and around villages erected in the various provinces, some of which flourished much more than others. On account of the climate the white population settled more thickly in the southern part of Brazil, where flows nearly all the immigration from Europe, while the black population was introduced on a much larger scale in the north, which was the center of agriculture for three centuries, from 1500 to 1800. For this reason there are parts of the country where the population has become

[1] Reclus, opus cit., p. 448.

greatly accumulated, as in the State of Rio and the Federal district, where the density of population is over 26 inhabitants per square kilometer, while in the interior the country is virtually unpeopled, at least as regards the white race, as the density is not more than 1 inhabitant for every 10 square kilometers. The state of Minas-Geraes is an exception, notwithstanding it is situated in the interior, on account of its mining wealth it is one of the most populous districts of Brazil.

The following is a list of the principal cities and towns of Brazil, with their population, according to the census of 1890:

Rio de Janeiro	[1]768,000	Alcantra	15,000
São Paulo	[2]200,000	Sorocabo	14,000
Bahia or S. Salvador	200,000	Bom-Fim	14,000
Pernambuco or Recife	190,000	Maragogipe	13,000
Pará, or Belem	100,000	Diamantina	13,000
Porto Alegre	100,000	Alegrete	12,000
Manáos	30,000 to 50,000	Alagoinhas	12,000
Fortaleza	48,000	San Domingos	12,000
Natal	40,000	Abaaté	12,000
San Luis	38,000	Vigia	11,000
Maceio, or Alagôas Maceio	30,000	Santo Amaro	11,000
Pelotas	30,000	Parahybuna	11,000
Curitiba	20,000 to 30,000	Piracicaba	11,000
Florianopolis or Desterro	27,000	Itú	11,000
Nictheroy	25,000	Parahiba, or Parahyba	10,000
Santos	25,000	Iguape	10,000
Caxais	24,000	Aracajú	10,000
Therezina	22,000	Goyanna	10,000
Cameta	21,000	Carolina	10,000
Villa Real da Praia Grande	20,000	Jacobina	9,000
Campos	20,000	Cachoeiro	9,000
Ouro Preto	20,000	Cuyubá	8,000
Aracaty	18,000	Entre Rios	8,500
Ceará-mirim	18,000	Victoria	8,000
Braganza	17,000	Rio Formosa	8,000
Breves	17,000	Jaguarão	8,000
Amarante	17,000	Paranguá	8,000
Feira de Sant'Anna	16,000	Botucató	7,000
Santarem	16,000	Ponta Grossa	7,000
Parahyba	15,000	Ilhéos	6,000

[1] Latest reports, 779,000.

[2] Latest reports, 270,000.

CHAPTER II.

HISTORICAL SKETCH.

In 1500 the Spaniard Vincente Yañez Pinzón, one of Columbus's companions, discovered the northern coast of Brazil from Cape San Augustin to Cape Orange. A little later, in the same year, Pedro Alvarez Cabral, while in command of a Portuguese squadron destined for India, in order to escape the calms off the coast of Guinea, took a course which led him to the far west. On the 22d of April (the 3d of May according to the Gregorian correction of the calendar now in use) he sighted land and anchored in a haven which he called Porto Seguro, in the present State of Bahia. Cabral took possession of the country in the name of the King of Portugal and named it "The Land of the True Cross" (Vera Cruz), changed a little later on to Santa Cruz, or Holy Cross. Shortly after, however, the country became known as Brazil on account of a dyewood found there similar to that imported into Europe from India, and which bore a closely similar name. In 1493 a bull of Pope Alexander VI fixed the limits of the possessions of Spain and Portugal at 100 leagues west of Cape Verde, giving Spain all the countries which might be discovered and converted west of that meridian and Portugal all those to the east. The following year the treaty of Tordesillas extended the boundary line to 370 leagues west of the Cape Verde Islands. After the discovery of Brazil a bull of Pope Julius II in 1506 confirmed this treaty.

India at this time occupied preeminently the attention of Portugal, too poor in men and resources to effectively govern all the possessions with which its adventurous conquerors were enlarging its domains. At first little account was taken of Brazil, although various expeditions continued the exploration of its vast coast. In two of these expeditions (1501–1504) the renowned Americus Vespucius took part. Little by little the coast was traversed, its capes, rivers, and harbors known, and the Portuguese Crown, realizing at last the importance of the colony and fearful of the persistent competition of the French, sent (1531) a squadron, commanded by Martim Affonso de Souza, to begin the colonization of the country. Before this no attempt at colonization had been made, except the landing of exiles effected by several expeditions on their way to India.

The Portuguese Crown divided the country into hereditary autonomous captaincies, which were distributed among some of the Portuguese nobles. Most of these attempts at colonization failed, however,

owing to conflicts with the natives, the negligence of the incumbents, the weakness of the expeditions, shipwrecks, and other causes. Pernambuco, founded in 1526 by Christovão Jacques, was one of the few sections in which the energy and good judgment of the concessionaire, Duarte Coelho, succeeded in restoring and maintaining a feudal-like system for nearly a century. Portugal therefore, realizing the necessity of centralizing the administrative and military strength for the expulsion of the French invaders, established at Bahia, in 1549, a central government, over which Thomé de Souza was appointed governor-general.

With De Souza came the first Jesuits, whose influence in Catholic courts was beginning to be all powerful but whose dream of power consisted in the subjection and conversion of the natives. Some historians have attributed to the Jesuits a great beneficial influence in the future of Brazil, especially as they were always opposed to the slavery of the Indians by the colonists and undertook the conversion and education of the savages. But the most ingenuous of the Brazilian historians, Varnaghen, maintains that the influence of the Jesuits was responsible for the introduction of African slaves which have complicated the racial problem in Brazil. The truth is that the Jesuits advised that negroes should be imported into the country. On the other hand the education they gave the Indians was very superficial, their only aim being to keep them under their rule. The native race never rehabilitated itself and Brazil has a considerable number of African descendants. São Paulo was the only captaincy which never tolerated the Jesuits, and also the one that prospered the most.

In 1555 Villegaignon, with a small colony of French Huguenots, settled on an island in the bay of Rio de Janeiro; but the settlement was captured (1560) by the Governor-General, Mem de Sá, assisted by the eloquence of the priests as well as by the arms of the colonists. The French also established settlements in the North, where they maintained friendly relations with the aborigines. Pernambuco was the center of the aggressive movement against these Northern settlements, the most substantial of which was Maranhão, which was captured with considerable difficulty (1615).

The annexation of Portugal to Spain (1580–1640), effected by Philip II, only increased the enemies of the former. The English and the Dutch began to frequent the Brazilian waters and to plunder the settlements. The Dutch were the more successful, founding a colony which extended along half the coast, and which threatened to overthrow Portuguese supremacy. The first Dutch settlement at Bahia was captured (1624) by a combined expedition of Spaniards and Portuguese. The Dutch settlement at Pernambuco was more successful, enduring twenty-four years under the direction of "The Commercial Company of the West Indies," at whose expense expeditions were fitted out. This period, however, was far from tranquil. The most peaceful phase

of it was the administration of Prince Maurice of Nassau, who extended the Dutch possessions along the coast as far north as Maranhão, and as far south as Rio Real, near Bahia, and enlarged the company's dominion by the capture of the African posts of São Thomé and Angola, recruiting stations for slaves employed on the sugar plantations.

The period during which Maurice of Nassau was governor was one of the most brilliant in the colonial life of Brazil. Pernambuco, owing to a more select and stable colonization, was already distinguished by the sumptuous style of living and showy costumes of its people, Maurice, a prince of great intelligence and amiability, maintained friendly relations with the Portuguese colonists and surrounded himself with a court in harmony with his tastes and talents, in which figured painters, naturalists, classical scholars, botanists, and other men of renown.

The commercial company, however, jealous of the aristocratic splendor of *Mauritzstadt* (now a part of the city of Recife), and giving heed to the intrigues of those in disfavor, deprived the prince of his dominion, substituting a triumvirate of merchants. To the oppressions of the foreign yoke were now joined exactions, which the comparative commercial freedom and modest self-government introduced by Maurice had alleviated. To this was added, as the determining element of revolt, the separation of Portugal from the Castilian Crown (1640), which gave new vigor to patriotic pride. Maranhão was the first to overthrow the Dutch supremacy (1642). At Pernambuco, the seat of Dutch Government, the undertaking was more difficult; but the conspiracy formed by João Fernandez Vieira, Antonio Cavalcanti, and other Portuguese colonists finally succeeded, with the assistance received from Bahia, the seat of the Portuguese Government, where Luiz Barbalho and many other veterans of the first campaign were waiting eager for war. Soon after the revolt the Dutch were overthrown at Tabocas and Casa Forte (1645). Meanwhile in Europe, as the result of the closer relations existing between Portugal and Holland since their emancipation from the Spanish domination, the affairs of Brazil were passing through curious diplomatic phases, until King John IV, upon the advice of the celebrated Jesuit orator and writer, Antonio Vieira, abandoned the rebels to their fate. However, they were not disheartened, and the war was continued, Portuguese, Indians, and negroes fighting in fraternal union. The two battles of the Guararapes Hills (1648–1649) marked the height of the campaign, which ended in the surrender of Recife after a prolonged siege.

The unity of Brazil was due to the military strength of the colony in the long and tedious campaigns by land, while by sea, owing to the bravery of the Dutch and the superiority of their vessels, fewer laurels were won by the Portuguese squadrons, the most powerful of which, under the command of Count da Torre, was destroyed while

Maurice of Nassau was governor of the colony. Nevertheless, the maritime expedition which Salvador Correa de Sá organized at Rio de Janeiro captured the African post of Angola (1648).

The subsequent period of the history of Brazil is marked by great colonial expansion. From the colony of São Paulo, founded by Martim Affonso de Souza, set out expeditions, called *bandeiras*, which were largely composed of adventurers of different nationalities. In the search for gold they penetrated far into the interior, waging a continuous war with the Indian tribes, who were but poorly protected. As a result of these expeditions, Minas Geraes, Goyaz, and Matto Grosso were founded in the interior and Santa Catharina and Rio Grande in the south.

These expeditions led to the discovery of the famous gold and diamond mines which enriched Portugal during the eighteenth century and gave a new aspect to Brazil. The seat of conflict was now transferred to the south, where contests arose between the inhabitants of São Paulo and the Jesuits over the enslavement of the Indians. It may be said that this was a contest between commercial realism and theocratic idealism, which, being impossible of realization in Brazil on account of the indefatigable persecution of the *bandeirantes*, took refuge in Paraguay. Under the administration of the great minister of Joseph I, Marquis de Pombal, that contest was ended by decrees granting complete freedom to the natives (1755) and ordering the expulsion of the *Companhia de Jesus* (1759), whose growing unpopularity had provoked repeated disturbances of the public order.

Moreover, the enemy had now ceased to be French, English, and Dutch, and had become Spanish, and the seat of war had changed to the frontiers of the possessions of the two countries in the regions bordering on the River Plate. The colony of Sacramento, founded by one of the governors of Rio in the territory now comprising the Republic of Uruguay, was the chief cause of discord and eventually passed from the possession of the Spaniards into that of the Portuguese, reverting to the former by the treaty of Madrid (1750) negotiated by the Brazilian diplomat Alexandre de Gusmão, in exchange for the Jesuit missions on the left bank of the Uruguay River. The Jesuits incited the natives to resist the Portuguese occupation, and the united Spanish and Portuguese forces were required to put down the insurrection (1754–1756). The treaty of Madrid also recognized the rights of the Portuguese to territory beyond the meridian agreed upon in 1494.

The marking of the boundary in accordance with the treaty was not effected, however, and new wars followed, extending as far north as Santa Catharina. The Spaniards took this island after seizing the territory on both sides of the Rio Grande do Sul, which the Brazilians recovered (1761–62). Finally the treaty of Santo Ildefonso (1777) restored to Brazil all her territory except the colony of Sacramento.

Even as late as 1801 the Brazilian forces were invading the missions, driving out the Spaniards in Matto Grosso and contending over this same boundary line, which, during the period of the Empire, afforded a great field for diplomacy, and was finally (1895) arbitrated by President Cleveland.

During the Spanish war of succession in the eighteenth century, in which Portugal became involved, the French returned to Brazil with hostile intent. The dispute over the French possessions in the north, in the neighborhood of French Guiana, was unimportant, but in the south the unsuccessful expedition of Duclerc against Rio de Janeiro was followed by a bloody visit from Duguay-Tronin, regarded in France as one of the most brilliant exploits of that distinguished sailor.

It was in the eighteenth century also that the first serious differences arose between the Portuguese and Brazilians. In Minas Geraes the colonists of São Paulo and the intruders or foreigners contended for gold, and at Pernambuco the inhabitants of Olinda, or the aristocrats, and the Portuguese merchants of Recife, contemptuously called *mascates* (peddlers), came to blows for less directly interested motives. The exactions of the Portuguese in Minas Geraes finally resulted in a conspiracy (1789) for the independence of the colony, which sought in vain the assistance of the United States through Thomas Jefferson, then United States minister in Paris. Implicated in this conspiracy, which was prematurely discovered, were three distinguished Brazilians, Claudio da Costa, Thomaz Gonzaga, and Alvarenga Peixoto. Da Costa committed suicide in prison; Gonzaga and Peixoto died in exile in Africa. Only one conspirator was executed, Ensign Silva Xavier, called Tiradentes (Toothpuller), who has become in later days the national idol, especially since the Republic.

The idea of independence received a much stronger impulse, however, by the transfer to Brazil of the Portuguese court (1808), which had fled before the advancing army of Napoleon. The French Emperor had ordered the invasion of Portugal and the deposition of the Braganças as allies of England. The sovereign Queen of Portugal, Donna Maria I, was insane, and her son, Prince João, was regent. With kindly intentions and sincere affection for the colony which he practically liberated, he inaugurated in Brazil a period of great progress. He not only introduced printing presses, established schools, and promoted arts and sciences, but opened the doors of Brazil to foreign commerce and extended the national boundaries (1809). To the north he annexed French Guiana in retaliation for the deeds of Napoleon, but in accordance with an article of the treaty of Vienna (1817), the territory was surrendered to France. To the south he annexed the *Banda Oriental*, in which was comprised the ancient colony of Sacramento, which, under the name of Provincia Cisplatina (1821), formed part of Brazil for ten years. Upon the fall of the Bourbon

dynasty in Spain, the Spanish possessions of the River Plate declared their independence, repudiating the government of Josèph Bonaparte. At Montevideo, which was the last to leave the protection of the mother country, the dictator Artigas set up an independent government, refusing to recognize that of Buenos Ayres (1814–1817). After the expulsion of Artigas the Uruguayans asked John VI to annex their country to his dominions.

Republican ideas, however, began to be developed in the north, a regular, independent government being organized at Pernambuco. Though it lasted but a few months it succeeded in stirring up in the neighboring provinces a rebellion which required considerable force to suppress. This was finally done, however, and a number of the revolutionists were executed.

During the remainder of King John's reign in Brazil there were no disturbances of the public tranquillity save the revolutionary movement corresponding in Brazil to the Portuguese revolution of 1820. This movement was due to the liberal ideas disseminated in Europe by the French revolution, the wretched condition of the kingdom, aggravated by the removal of the court, and the indignation and resentment felt at the Sovereign's voluntary separation from the mother country.

Brazil had in fact supplanted Portugal as the seat of the Portuguese monarchy. Rio de Janeiro was the residence of the court, nobles, and prominent men of the kingdom. The country was visited by large numbers of foreigners, including distinguished scholars, and trade relations were directly established with the world, and all this changed the customs and manners of the people. The Cortes of Portugal tried to put an end to this state of things, recalling in 1821 the King, who departed for Lisbon, leaving behind him as regent of the Kingdom of Brazil his eldest son, Dom Pedro I.

The Cortes of Portugal directed the dissolution of the central government of Rio, with the view of attaching the provinces directly to the home government. Brazil, however, was not disposed to return to the colonial period, sacrificing its progress and its dignity as a kingdom to which King John had raised it. A revolutionary movement against Portugal was enthusiastically welcomed by all classes, and found a powerful ally in the person of the prince regent. He had been reared and educated in the colony and was surrounded by able statesmen anxious to liberate their country, among whom J. B. de Andrada, considered the father of his country, was the most conspicuous. Young, impetuous, with a mind keen, though but little cultivated, Dom Pedro was pining for an opportunity to act and distinguish himself. He realized, too, that Brazil might win her independence without his aid, and that it would be better for him to head the movement than to let it resolve itself into anarchy, as was the case in Spanish America.

The separation from the mother country was effected gradually and almost peacefully. The increasing hostility of the Cortes aroused a national sentiment in Brazil and excited a desire for independence, which was finally declared (September 7, 1822).

Local resistances were soon put down. The garrison at Bahia, under the command of the Portuguese general, Madeira, capitulated, and Maranhão surrendered to the Brazilian squadron (July 28, 1823).

The proclamation of the Empire was followed by the convocation of a constituent assembly, composed largely of men of advanced ideas, which caused the dismissal of the Andrada ministry and adopted a radical policy, aiming to dispense with the imperial sanction in its legislation. The press, suddenly set free, encouraged these democratic tendencies and aroused feelings of distrust between the Portuguese and Brazilians. The Emperor, who was naturally impulsive, dissolved the constituent assembly and adopted a constitution, drawn up by a council of state and approved by the municipal governments. Pernambuco, however, opposed this political proceeding, and demanded the restoration of the original constitution. Finally yielding to its republican and federal aspirations it formed, in conjunction with the neighboring provinces, the Confederation of Ecuador (July, 1824). The revolt was promptly suppressed by the local unionists and Government troops (November, 1824). Some of its leaders fled to foreign countries and others were executed, among them Friar Caneca, a monk of great learning and renown.

Portugal recognized the independence of Brazil August 29, 1825. The reign of Pedro I was unfortunate from a military standpoint. In 1825 a revolution began in the Cisplatine province, instigated by the Government of Buenos Ayres, which desired the annexation of the province to that country, basing its claims on the community of language and historical traditions. After some fighting on land and sea, with varying fortunes, both Brazil and Buenos Ayres renounced all claim to the province (1828), which was erected into an independent State, the Oriental Republic of Uruguay.

The loss of the Cisplatine province and the autocratic tendencies of Dom Pedro I rendered him unpopular, and the feeling between the Portuguese and the native elements became intensified after the death of John VI (1826), when the Emperor abdicated the throne of Portugal in favor of his daughter, Dona Maria. He still gave considerable attention, however, to the affairs of the Kingdom, where his brother, Dom Miguel, the regent and fiancé of Dona Maria, embodying the absolutist reaction, usurped the throne. The liberal opposition in the Brazilian Parliament increased, and the federalists, who in 1822 had sacrificed their dream to the preservation of the union, now began a vigorous renewal of their agitation. The country was without political education, and its ignorant population offered no foundation for a representative government. The Emperor tried the

experiment of a direct parliamentary government (1827), but this did not appease the opposition, and served but to increase the abuses of the press, which received much encouragement from the triumphs of the French revolution in July of that year (1830). Finally an insurrection of the people, aided by a military revolt, compelled the Emperor to abdicate in favor of his son (April 7, 1831), and he embarked for Europe to sustain with all the ardor of his temperament the throne of his daughter and the constitutional government of Portugal.

Dom Pedro II, the successor to the Brazilian throne, was then scarcely 5 years old. The regency during his minority was marked by two distinct phases, it being on the whole the most stirring and interesting period of modern Brazilian history. The regency was first constituted by a triumvirate which was obliged to put down a number of insurrections, incited by the reactionists or *caramurús*, and the republicans (1831–1835). These revolutionists were partly appeased, however, by the *acto addicional* (additional act), which established a greater political decentralization. Father Feijó, of São Paulo, was appointed sole regent. He was a man of great intelligence and energy, and knew how to conform his almost radical ideas to the respect due authority. To the undisciplined army, accustomed to great license in the civil wars and in those with the countries of the River Plate, and whose vanity had greatly increased since the independence of the country, he opposed the national guard, and assisted by the journalist, Evaristo da Veiga, and the eminent statesman, Bernardo de Vasconcellos, exercised a government at once firm and liberal (1835–1840). The pacification of the country progressed rapidly. Pará was subdued and order reestablished in Ceará and Pernambuco, which had been disturbed by reactionary movements (1832–1835).

A conservative parliamentary reaction, led by Araujo Lima, Marquis de Olinda, and Bernardo de Vasconcellos, believing that too great concessions had been made to the Federalists, overthrew the regent, Feijó, who was replaced by Araujo Lima (September 18, 1837). But the oligarchy did not succeed in dominating the country. Bahia revolted, Maranhão followed its example, and in Rio Grande do Sul the movement became separatist (1835–1845).

The declaration of the majority of the young Emperor was longed for by many public men, who were anxious to see the authority vested in a single person. The majority of Dom Pedro II was, therefore, anticipated, and at the age of 14 he began his long reign (July 23, 1843).

The disturbances in the country had now become chronic and were not to be suddenly pacified. The first five years of the reign of the second Emperor were still marked by insurrectionary movements, all of which, with the exception of the revolt of Pernambuco, were subdued by the powerful sword and wise policy of Alves de Lima,

who has been called the Wellington of Brazil. Maranhão (1841), São Paulo, Minas Geraes (1842), and Rio Grande do Sul (1845) owed their pacification to this valiant supporter of the monarchy. Meanwhile the people of the country were being educated politically; the parliamentary elements were gaining experience, moderating their passions, and coming more and more under the personal influence of their sovereign, who took the place of parties to a great extent. The so-called conciliation or party fusion (1853) was the first manifestation of this predominant influence of the throne upon national politics. From this time forward there was but a slight difference between the two political parties called Conservatives and Liberals. Frequent changes were made in their leaders, and it could readily be seen that, under the impress of the Imperial will, the Liberals were becoming every day less progressive and the Conservatives less deserving of their name.

The history of the reign of Dom Pedro II, after the suppression of the civil disturbances, might be treated under three leading heads: Wars with the countries in the southern part of the continent; abolition of slavery, and the material development of the nation.

There were two foreign wars, the first being against the Argentine dictator, Rosas, in defense of the independence of Uruguay, which ended in the victory of Monte Caseros and the free navigation of the affluents of the river Plate (1851–1854). The second, of five years' duration, was much more serious. It cost Brazil $315,000,000 in addition to many thousands of lives and almost annihilated the Republic of Paraguay (1865–1870). Brazil was engaged in a war against Uruguay (1864) when Lopez, dictator of Paraguay, invaded the provinces of Matto Grosso and Rio Grande do Sul, in Brazil, and Corrientes in the Argentine Republic. This led to an alliance between the two countries attacked and Uruguay (1865), where, in the meantime, a change of government had taken place. This war may be divided into three periods. At the beginning, while operations were confined to Argentine territory, the allied forces were under the command in chief of the Argentine President, General Mitre. In the naval battle of Riachuelo, the Brazilian naval forces, under the command of the Brazilian admiral, Barroso, destroyed the Paraguayan squadron soon after military operations had begun, but on land the operations were not decisive. A corps of the enemy's army was forced to surrender at Uruguayana (1866), and a few battles were won by the arms of the triple alliance; but Lopez preserved intact the territory of Paraguay. It fell to Marshal Caxias, whom the Emperor appointed commander in chief of the allied forces, now almost reduced to the Brazilian contingent, to completely invade the dominions of the dictator, which had already been entered by Osorio, Marquis de Herval, the famous Brazilian general. The Brazilian ironclads forced the passage of Curupaity (1867) and Humaitá (1868), on the river Paraná,

and the army was enabled to push its way to the interior of Paraguay, repulsing the enemy in the bloody battles of Itoróró, Avahy, and Lomas Valentinas (1868), and forcing Lopez to take refuge in the interior to organize new forces. The third and last campaign against Lopez (1869–70) was conducted by Count d'Eu, son-in-law of the Emperor, who took Peripebuy, defeated the enemy in the battle of Campo Grande, and ended the war, pursuing the Paraguayans in all directions. The dictator, Lopez, was surprised by General Camara, Viscount de Pelotas, and in attempting to escape was killed (March 1, 1870).

Thus ended this distressing war, remarkable for the bravery displayed by both sides. It secured to Brazil the free navigation of the Paraguay, putting the province of Matto Grosso in fluvial and maritime communication with the rest of the country.

In accordance with the treaty made with England in 1826, Brazil was bound to suppress the African slave traffic in 1830, but having failed to comply with the terms of the treaty, England passed the Aberdeen bill (1845), which authorized English war vessels to search and capture all slave vessels found in Brazilian waters and ordered those engaged in the traffic to be tried by British tribunals. Soon after, however, through the efforts of the Brazilian minister, Euzebio de Queiroz, the traffic was completely suppressed (1851). The movement in favor of abolition continued to grow, however, among the officials and thinking men of the country, but its complete realization was delayed by the Paraguyan war, which for five years occupied the attention of Brazil.

The antislavery sentiment increased under the Itaborahy ministry, which was composed of the most obstinate elements of the Conservative party. The Conservative statesman Silva Paranhos, Viscount of Rio Branco, breaking away from a large part of his colleagues, advocated and obtained from the Parliament the passage of a bill, September 28, 1871, for the gradual extinction of slavery, which provided that thereafter every child born of a slave mother should be free, and created a fund for emancipation by redemption. This was a great step in the direction of emancipation. The number of slaves began to decrease, their freedom being also obtained through private philanthropy, largely directed by the Masonic lodges, rather than by the fund created for this purpose.

The Abolition party was organized (1879) after the Liberals rose to power during the Sinimbú ministry. The question became the chief problem of Brazilian politics until the Dantas ministry unsuccessfully presented to Parliament a bill for the gradual abolition of slavery (1884). But it was too late to retreat or even to stop. The provinces of Amazonas and Ceará had already set free the few slaves within their limits, and in São Paulo, where they were more numerous, the idea of emancipation was gaining many converts. The Saraiva min-

istry (1885), with the support of many conservatives, carried a bill through Parliament, declaring free all slaves of 60 years and upward, and fixing a diminishing scale for the value of slaves according to age. This ministry was followed by that of Baron de Cotegipe, leader of that faction of the Conservative party advocating the status quo, which it became impossible to maintain. The abolition movement can not be said to have departed from its legitimate field, but it aroused public opinion to an extraordinary degree, it becoming necessary to put a stop to it. This could not be done by coercive measures, since the army refused to pursue the fugitive slaves whom the leaders of the emancipation propaganda in São Paulo and elsewhere had enticed to leave the plantations. Two leaders of the Conservative party, Senator João Alfredo and Antonio Prado, declared themselves in favor of a more radical law (1887). The Imperial Princess, then Regent, in the absence of the Emperor, dismissed the Cotegipe ministry and called upon Senator João Alfredo to form a new ministry, which presented a bill for immediate and unconditional abolition.

Parliament opened, according to custom, on the 3d of May; on the 8th the bill was presented, and five days later, May 13, 1888, the Princess Regent, Isabel, signed the law, after it had been discussed and voted by both chambers. A wild enthusiasm followed; but the slaveholders, or agricultural classes, who rightly held that they should receive at least partial indemnification for the loss of a property which the law had heretofore not only guaranteed, but also taxed, and which in many cases constituted the best part of their belongings, accused the throne of spoliation, and hastened to join the ranks of the Republican party.

This party, although finding antecedents in Brazilian history, is of comparatively recent origin. It was first organized in São Paulo and Rio de Janeiro (1870) by a distinguished lawyer and publicist, Saldanha Marinho, who until then had been a member of the Liberal party. This was due especially to the influence exercised by the proclamation of the French Republic, for the political events in France have been more or less reflected in Brazil, where education is essentially French in character. The Republicans had ably conducted journals and published books, which did much to disseminate democratic ideas.

The Republicans acted in harmony and with ability and determination, endeavoring to direct the course of events, whenever possible, to the prejudice of the established institutions. They realized that, in spite of the wisdom and undoubted patriotism of Dom Pedro II, the throne was absolutely isolated. Professional politicians did not forgive the Emperor his personal control over the less important affairs of the Government. The church saw itself abandoned for Freemasonry and two of its prelates, the bishops at Pernambuco and Pará, imprisoned on account of disrespect to the doctrine of imperial

supremacy. The institutions of learning encouraged and taught democratic ideas. Only the army and the agricultural class, which constituted the electoral basis of the nation, remained loyal to the monarchy.

The Republican party sought to establish its principles by evolution, that is, by an orderly and legal procedure. But the people were too ignorant and apathetic to furnish the means for that transformation. The army understood the situation, and among its generals and military instructors some of the most ardent advocates of the Republic were found. The young members especially sympathized with the teachings of Prof. Benjamin Constant, who became the inspiration of that movement which in a single day and without bloodshed overthrew the monarchy (November 15, 1889). Secure in the cooperation of part of the garrison of Rio and confident of the popularity of their cause among the conservative classes, the Republicans believed that the time had arrived to strike the final blow; this was hastened by the action of the Liberal ministry, under the leadership of Viscount de Ouro Preto, advocating a policy of repression and ostensibly preparing the advent of a third reign by the abdication of Dom Pedro II, who was ill and weary of the labors of his office, his mental faculties being seriously affected.

The Ouro Preto ministry promised not only a vigorous government but also reforms of administration, namely, a greater decentralization. The Republic went further; it was formed on the basis of the federation of the provinces, raised to the dignity of States. The provisional government, which for more than a year—almost up to the day of the approval of the new constitution, February 24, 1891—directed the destinies of Brazil, exercised a profound influence upon the national organization, converting the country into a free union, modeled after that of the United States of North America, divesting legislation of all its traditional and monarchic character and endeavoring to make a new Brazil rise from the ruins of the overthrown government. At the head of this Government was Marshal Deodoro da Fonseca, who had led the military insurrection, a soldier trained in the war of Paraguay, and the most popular of the generals who survived that war. He became the first President of the new Republic, being elected by the constituent congress after it had adopted the constitutional draft drawn up by a special committee and amended by the provisional government.

The administration of Marshal Deodoro da Fonseca under the new constitution was destined to be brief. Difficulties due to the inexperience of the new government soon arose between the chief of the nation, who was proud of his national reputation, and Congress, mainly composed of the oldest and most ardent advocates of the republican government. Meanwhile the States were being organized, but the parliamentary conflict at the capital finally led the Executive

to dissolve Congress, thus compromising the peaceful development of the institutions implanted in 1889. Local revolutions in the States overthrew the governors who had applauded the coup d'état of Marshal Deodoro da Fonseca, who, in order to avoid a more serious conflict, resigned the presidency in favor of the vice-president, Marshal Floriano Peixoto. Thus began for Brazil a period of unrest. In Rio Grande do Sul, which was one of the few States in which the Republican party had a regular organization during the Empire, the dissensions among the republicans were taken advantage of by the Monarchist party, and a revolution broke out which lasted three years—1892 to 1895—which the Federal government, at the request of the State government, endeavored to put down. Soon afterwards the revolutionists of Rio Grande were joined by almost the entire navy, September 6, 1893. One of the admirals, Saldanha da Gama, imparted to the movement a monarchical character, which its initiator, Custodio de Mello, did not wish to give it.

The revolt of the navy was the truly critical period through which the new Brazilian institutions have passed. It was saved by the remarkable energy of Marshal Peixoto, and by the enthusiasm manifested in their defense by the army, and especially by the youth of the country.

The revolt lasted many months, owing to the nature of the adversaries, one fighting on land and the other on the sea. All obstacles were conquered, however, and the Republic was able to enter upon its civil phase under the administration of President Prudente de Moraes, who concluded the civil war in Rio Grande, strove for the maintenance of the public credit and for the industrial development of the country, and put down other disorderly manifestations of religious fanaticism in the interior of Bahia.

President Moraes was succeeded at the end of the legal period (1898) by the present incumbent of the Presidency, Mr. M. F. de Campos Salles, whose term of office will end November 15, 1902. President Campos Salles is ruling the country in what might be called a time of good feeling, and is employing his utmost energy to restore the national credit, foster the national industries, and improve the existing friendly relations with all nations.

During the Moraes administration President Cleveland, as arbitrator, decided in Brazil's favor the boundary dispute of more than a century's standing with the Argentine Republic. A similar and no less important contention with France over the boundaries with French Guiana has been recently decided by the arbitrator—the Swiss Government—in favor of Brazil.

CHAPTER III.

NATIVE RACES.

[By J. HAMPDEN PORTER, M. D.]

The classifications of Ehrenreich, Von der Steinen, and others have resolved all those entangled groups of Brazil into four families, which Keane, following Powell's nomenclature, calls Cariban, Arawakan, Gesan, and Tupi-Guaranian.[1] These aggregates are distributed over a vast land mass, to which its mountain system imparts geographical unity, making it both topographically and biologically almost insular. Its physical features closely connect themselves with the lives of native inhabitants; but there is no correspondence between this country's configuration and its political divisions.

A wide culture range exists here within certain family limits. Brazilian peoples at large include nomad hordes utterly savage, and tribes which have reached a grade where further progress seemed probable. It has in no case been made, however; retrogradation is the rule everywhere, except among those whose condition can not be lower.

Both those racial constituents from which the American type was developed appear in Brazil. Of these, that later neolithic Mongoloid immigrant who arrived by way of Bering Strait, represented incoming peoples probably more numerous than their Pleistocene predecessors, and also possessing a higher development. Survivals of this type would therefore seem as if they should be more widely scattered and distinctly marked, when compared with those of ruder, fewer, or less formidable men.[2] There is no doubt, however, about those

[1] Other subvarieties exist also, but as yet not identified. There are blond Indians in Brazil (Topinard) and tribes marked off by differences of features (Bates) or language (Réclus) from surrounding peoples, nonassimilable with either of America's original stocks, products of "side eddies" which form around the confluence of different races (Dubois).

[2] The most careful and thorough collocations of data scarcely warrant sweeping conclusions upon race criteria, physical or mental. Kollmann (Zeitschrift für Ethnologie, 1883) gives 15.75 per cent of dolichocephalism for America north of Mexico; 40.26 for the typical American mesaticephalous race; 25.81 per cent of shortheaded people; 11.96 of hyperbrachycephalous natives, with a small proportion of ultra shortheads, due to deformation. Topinard asserts that both Americas are mesaticephalous. Taking cranial type in its relation to culture, Broca includes Mexicans and Peruvians among subdolichocephalous groups, while Deniker and Laloy declare that the Aztecs were "never brachycephalous." (L'Anthropologie, Sept.-Oct., 1890.) On the other hand, Pueblo Indians, with Mayas, Guatemalans, and Chimus were undoubtedly shortheaded. We find the Muyscas, however, to have long skulls and comparatively advanced and conquering Iroquoians long ones also.

Brazilian proto-Mongols. Burton remarks that this strain shows itself in "big round Kalmuck heads, flat Mongol faces, with broad, prominent cheek bones, oblique Chinese eyes, not unfrequently bridés, and rather brown than black.[3] Furthermore, by dark, thick eyebrows. * * * Thin mustaches fringing large mouths with pointed teeth, and sparse beards not covering the long, pointed chin."

Primordial differentiation or variation during millenniums of wandering[4] produced another subrace, also inhabiting Brazil. It came to this continent when northern latitudes enjoyed a milder climate, and there were no spaces of open sea between Scandinavia, the Faröe Islands, Iceland, and Greenland. A wide distribution of these first comers took place, partly voluntary, but afterwards due to the pressure exerted by invading Asiatics. In one way or another they entered South America, and seem to have concentrated a portion of their numbers in Minas Geraes, a Brazilian province, which there is reason to believe became the center whence subsequent migrations proceeded. No such objections as have been made to Roth's pampa skeleton or the Calaveras skull, can be urged against those fossil remains discovered by Lund. The Lagoa Santa caves have yielded unquestionable proof of a "paleo-American subrace" (Quatrefages, Sören Hausen, Lutken), whose descendants still exist. Without referring in detail to anatomical features, they belonged to the great long-headed class of mankind; whereas those others from Asia had short heads.

In the New World these stout dark men, with narrow skulls, receding foreheads, ridged vertexes, flat-crowned incisor teeth, and projecting jaws, form a separate group that was in great part exterminated, absorbed, or driven into remote and isolated regions.[5]

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[3] Highlands of Brazil, Lond., 1869, vol. 11, p. 403. Von Tschudi, St. Hilaire, Hansel, and d'Orbigny record similar traits observed here. Peschel notes the same on both sides of Bering Sea, Humboldt witnessed them in Mexico and Darien, Moritz Wagner among native Venezuelans. Orton saw these features east of the Quito Cordillera, King recognized them in Patagonian Huillitches. Mongoloid traits exist, and this through inheritance; but "average American Indians present the sharpest contrasts to Asiatic Mongols." (Keane, Ethnology, Cambridge, 1896, p. 350.)

[4] Péroche (Les Températures quaternires, Lille, 1897) assigns 300,000 years as an approximate period for migrations prolonged enough to bring a definitively marked paleolithic type from southeastern Asia into western Europe, southern Australia, and central Brazil. Man's Pliocene precursor was distributed when all continents could be reached by land, and Pleistocene varieties developed in adjustment with different environments.

[5] Keane (Man, Past and Present, Cambridge, 1900) supposes them to have temporarily held their own in South America against proto-Mongols, but Virchow has shown that prognathism is incompatible with normal brain development, and being inferior in faculty, fewer, and less efficiently armed, this stand seems doubtful, if taken as a rule. Assuming the Sumadouro district of Minas Geraes as a point of departure, they apparently succumbed to more powerful rivals in the San Francisco catchment basin, to the west at Ancon, on the Entre Rios plateaux, throughout the pampas as well as at the Amazon's mouth.

DISTRIBUTION AND CONDITION OF BRAZILIAN TRIBES.

Tribal catalogues, chorographical descriptions, and linguistic analyses will go but a little way toward bringing these groups into view as they are. Information contributive toward this end is very unequal with respect to different families; while for them all, displacement, intercrossing, dislocation, regrouping, or decay, have done their worst in the way of modification and effacement. Disaggregation, failure, and obliteration, were noticeable facts to the earliest missionary priests and travelers in Brazil. Whole populations have vanished there, scarcely leaving a trace. Others are so effectually broken up that their tribal names and original languages have been lost. Mirhanas, for example, is an arbitrary collective title for a congeries of indistinguishable ethnic fragments which include about half the Amazonas indigines. The term Carayas is similarly applied in the Xingu and Araguaya basins. Those Indians now called Coroados derive this name from their tonsures. Botocudo means one who wears a botogue or labret. Tapuyo, originally signifying stranger, barbarian, is now synonymous with Indians friendly toward foreigners.

Caribs can not be traced beyond central Brazil, where they apparently originated. Detached bands from the Goyaz and Matto Grosso table-lands, migrating northward, settled in several West Indian islands, and may have reached Florida. Those on the Lower Tocantins are consanguine with Apiacas of Amazonas, and Macusi, Kalinas, Galibi tribes in French, English, and Dutch Guiana. If, as asserted, roundheadedness increases toward the south, Caribans are an exception to this rule. Among tribes on the Guiana slopes they were preeminent as warriors; yet it is significant that during protracted conflicts between white settlers on the coast, and Caribs, Arawaks, etc., who, without any formal confederation, united in a common hostility toward Europeans, those fugitive negroes fighting as their allies were more formidable than they. Captain Steadman, relating the operations of that famous Scots-Dutch regiment to which he belonged, makes it plain how much these maroons (African slaves) excelled the tribesmen engaged. This comparison goes further than much description toward settling their status and explaining how Ackawois, Macusis, or Arecunas came to be so much dreaded by contiguous peoples, who must needs have had little organization and military ability themselves.

Carijones, with Witotos on the Amazons, are also affiliated to this Cariban group, as likewise some scattered bands of Pimentaires roaming the Piauhy and Pernambuco borders. Their genealogy, however, rests upon linguistic resemblances, which are more than usually indecisive when entangled among a maze of shifting idioms, such as exist throughout Brazil. Despite many causes which might seemingly have kept Caribs apart from other tribes, much intermixture has taken

place wherever they may be found, and this is the condition of all South American aggregates, since by far the greater number exhibit anatomical traits belonging to diverse strains or, as Deniker terms them, "somatological units."[6] Modifications of course ensue from contact, and the circumstances attending crossing here have so operated, both in case of this group (Arawaks) and others, that separate descriptions of their respective cultures would involve considerable repetition. Whatever physical characters originally distinguished these families have become less accentuated through the mingling of blood, and they exhibit an approximation toward what is called "a theoretic American type." Both show singular resemblances and differences in habits, customs, etc. Im Thurn declares that Arawaks are "the cleanliest of Indians,"[7] while Caribs live in filth. The former, moreover, have adopted many European articles, but these last-named savages reject foreign improvements. If we include Warraus—who are Arawakan by blood, and near neighbors—in this contrast between peoples speaking totally dissimilar stock languages, these latter are the filthiest human beings conceivable; yet they build canoes for all adjacent tribes, displaying industry combined with thrift, while no Carib lives otherwise than from hand to mouth, and no Arawak makes anything that other natives want. Further comparison reveals additional dissimilarities. Arawaks bedeck themselves with foreign inventions and domestic ornaments. Caribs warriors distort their limbs by ligatures, pierce the under lip for labrets or wooden skewers, and are arrayed in feathers, animal pelts, and homemade fabrics, while a Warrau is apparently devoid of that vanity almost universal among primitive men, and gives little attention to adornment. He is, moreover, of a different physique and temperament from his nearest relatives; more stolid and less disposed to gayety or amusement; not so well developed in muscles, though of squarer build, having also a disproportionately long body and very broad, flat feet. "Any severe work soon tires Warraus." Im Thuru remarks that "they probably never attain old age," which seems probable from their semiaquatic modes of life on the northeast coast, and utter disregard for ordinary hygienic requirements.

Arawaks of Guiana call themselves Loconos—native people. They are widely spread in Brazil, but it is useless to inquire about their original habitat. There is no regular tribal system among their eastern bands, each elder ruling his own household without subordination to any central authority. Small groups, formed from those most closely connected, bear the same name which, whether it be eponymous and refers to an ancestral theory or not, is derived from some object in nature—a tree, insect, bird, or beast. Descent lies wholly

[6] The Races of Men, Lond., 1900.

[7] Indians of Guiana, Lond., 1883, p. 168.

within the female line, and marriage, if not strictly exogamous, is prohibited between recognized maternal relatives.

Both these loosely connected hordes build flimsy huts of wickerwork and brush. In those sites where Warraus are permanently seated, their dwellings rest upon piles driven into marshes or shallow waters; but Arawaks, occupying drier and less unhealthy localities construct settlements after the ordinary savage fashion, varying with respect to details as circumstances change. Thus among Brazilian forests, where dense foliage protects them against wind, rain, and sun, they inhabit sheds thatched by grass or palm leaves, and on the open campos guard against stress of weather with mud plaster or any device for sealing walls. As a whole, Arawakans have not developed unique characters. They exhibit no special results of inventive faculty, and still less of social aptitude, which can be said to mark them off from other families. On the one side, in fact, this group merges into almost complete savagery, and on the other its representatives rival Brazil's most advanced populations, from whom they probably borrowed that culture displayed in several localities on the Amazons. Arawakan Parexis, for instance, have established themselves in Matto Grosso, nomad bands reach 20° south, while permanent residents are found on the Amazon estuary and peninsula of Goajira. Nu-Arawaks, as Von der Steinen proposed to call them, appear under the name of Maypures along the Orinoco, and as Manaos, Yumanas, Paumares, Ipurinas, Mokos, by the Rio Negro, Ipure, and Upper Marmoré. These tribes exist in the most unequal states—in squalid half-fed nomad hordes, or living together as sedentary communities with all the appliances of life that any Brazilian Indians ever possess. Such, for an illustration, are Passé on the Solimoens; Arawaks with a tribal organization, definitely settled cultivators and traders, comparatively well supplied in every way through their own ingenuity and industrious habits. Bates speaks of Passé villages as being more prosperous than any others in that vast region;[8] and certainly these people with their regularly planted fields and comfortable houses, provided with furniture and utensils, seem to be well off. Their prosperity is, however, purely relative to worse states prevailing all around them. They are positively idle and improvident, sexually immoral, smoke inordinately, drink too much distilled cará, and, like every other Brazilian group wherever found, however situated, the Passé rapidly decline toward extinction.

Most natives in the wide basins formed along great rivers of Brazil proceed to extravagant excesses whenever their habitual apathy gives way. All savages are naturally prone to uncontrolled expressions of emotion, but tropical Americans keep up states of exaltation until they become morbid and destructive. Conversely, despondency, to

[8] The Naturalist on the Amazons, Lond., 1876.

which these natives yield without a struggle, acts as it never could do among men who had any mental or physical stamina.[9]

Primary traits having a true classificatory value, are more marked in the case of Gessan than among other families inhabiting Brazil. They received this title from Von Martins, who took the common terminal of tribal names for a collective designation. Men, Deniker remarks, are not separable as zoological species or varieties, but segregate into "ethnic groups," which may include different races, and consequently exhibit divers structural traits that persist amid secondary changes. In such combinations of unlike human beings the aggregates subsequently formed do not embody actual types, but approximations to them.[10] This Gessan, or, as Kean calls it, Botocudo individuality, in large measure escaped the blending process which made a distinctly American man out of strongly differentiated elements coming from opposite quarters of the world. They preserve those characters distinguishing their paleolithic European progenitors. When taken en bloc the mental inequality shown by divergent branches of other stocks is here scarcely recognizable in varying degrees of aptitude for adjustments to dissimilar environments; e. g., more or less skill and ingenuity, an unequal response toward incitements that initiate progress. Gessan tribes have scarcely become modified; they remain undeveloped without exception; no group of this family is otherwise than completely savage.

While Caribs, Arawaks, and Tupis are sometimes indistinguishable, structural survivals cut Aimores or Botocudos off from these, and closely unite them with proto-Europeans. Kayapos, between the Araguaya and Xingu rivers, various small bands in Goyaz, Akuas (often called Charentes) on the Upper Tocantins, with Cholengs, Kames, and several minor hordes scattered over southern Brazil, represent a single group extending from the Amazons to the Rio de la Plata. These are true aborigines; fragments of a mass broken up by Tupi-Guarani invaders, and "the nearest representatives and probably the direct descendants of that primitive race whose osseous remains have been

[9] Vital failure from prostration of spirits is a well-recognized phenomenon; yet nothing can be more perplexing to a medical traveler than seeing these Indians make up their minds to die of some mild complaint, and then actually do so. There is a complex of abnormal functions, both physical and psychological, involved in these cases. Despondency or despair has played so conspicuous a part in this country as the cause of death among natives subjected to foreign rule, that its modus operandi has received all kinds of fanciful explanations. People with sound bodies, however, rarely if ever perish from grief. They react against those depressing influences which it exerts. There must be coordinate organic insufficiencies, persistent asthenic states and vices of nutrition to bring about fatal results. These belong to the race and to circumstances of life. In reviewing Brazilian tribes with regard to their alimentation, acclimatization, hygiene, etc., some light may be thrown upon those conditions which produced so great a mortality under emotional stress.

[10] The Races of Men, Lond., 1900, p. 3–4.

found in Lagoa Santa caves and Santa Catharina shell mounds."[11]

Peixoto[12] finds that same well-marked head among these peoples which Lund discovered in the Quaternary clays of Minas-Garaes—crania such as have been identified with skulls of the old stone-age period throughout western Europe.

It is not known that Gessan bands went far westward into the interior of Brazil, most inhabitants of which country are neither round nor long headed, a fact pointing unmistakably to crossing between original immigrants. But on eastern slopes, although the primordial elongated paleolithic skull retains its character, it has been considerably modified, and in some instances is nearly unrecognizable. Probably it would be impossible to identify ethnic strains among Tapuyos, while Akroa and Capayos about the Upper Grajahus sources have doubtful genealogies, and certain anomalous nomad cannibals roaming in forests or on rivers of Minas-Garaes are only linguistically Gessan. All these, with Botocudos at their head, remain in a state of unmitigated savagery. A brief mention will comprehend most that is important concerning the latter.

"They have not even reached the stone age," Keane observes, but it is mere verbiage to explain this backwardness by saying with certain writers that eastern Brazil has no stone suitable for working. Such is not the case. Other Indians find it there, or, understanding its value, procure such material by barter if actually absent. Bates states that one may travel for weeks over that clay, alluvium, and mold, bordering the Solimœns above Manacapuru without seeing a piece of stone; yet every tribe within this region has been able to remedy the deficiency. Botocudos, however, use wood almost exclusively, and manipulate it with just so much ingenuity as absolute need inspires. There are no inventions which subserve any requirements of ease, comfort, or decency; none whose aims extend beyond the mere preservation of life. Their lodges are brush shelters bound together by vines or strips of bark. They have no furniture, and until lately did not use hammocks, being accustomed to sleeping in the ashes of their fires or covering themselves with bast litters. Keane and Bigg-Wither, who visited them, describe Botocudos as naked nomads of the forest, living on its productions—fruits, nuts, berries, tubers, and roots, supplemented by snakes, frogs, grubs, or any food these poorly equipped hunters can procure.

Chiciriabas, Akroas, Apinages, and Charentes are thorough cannibals; moreover, their dead children are eaten in the expectation of reuniting with them, while enemies killed in battle and devoured, confer whatever courage they possessed upon those who consume their bodies.

[11] Keane. Man, past and present. Cambridge, 1900, p. 436. The specific character of this subrace has also been recognized by Sören Hausen, Lutken, and Quatrefages.

[12] Novos Estudios Craniologicos sobre os Botocudos. Rio Janeiro, 1882.

Apart from this superstitious anthropophagy, however, tribes of the Botocudo group hunt men as they do other creatures, killing members of neighboring tribes for meat whenever an opportunity offers.

Marital relations belong to the lowest order anywhere found in operation among mankind; they are temporary unions. Women have no position or influence and receive neither consideration nor mercy. That universal animism common to primitive men, rises no higher with such beings than a lively belief in malignant spirits who come from the moon. There is some vague idea of benign solar agencies, but their religious observances and rites are chiefly directed toward placating lunar demons.

Deniker distributes Tupi-Guarani tribes over "the plains of the Amazon and Orinoco, with Guiana and the table-lands of eastern and southern Brazil."[13] This is a composite group, as its name indicates, although those differences their title expresses relate to geographical position more than family diversities. The ethnic constituents are in fact similar, but Guaranis probably came originally from Paraguay. Early missionary priests constructed a lingua franca whose diffusive quality gave it an advantage over native tongues, that were often very unlike; so the former spread widely, and tribes who spoke it got to be called Tupis. Originally, however, the language of this branch had a great range, covering about one-fourth of South America. Tupi communities purer in blood and far more powerful, or at least more numerous than now, were seated on the Amazon proper and all its tributaries. At present each has dwindled, and except along the Solimœns, it is impossible to find an unamalgamated population.

These groups, in common with most others crossed in all directions, have mingled foreign strains among themselves, until by far the greater majority are either Mamelucos, or descendants of indigines and white men; mulattoes, Cafuzos, representing a cross between negro and native stocks; Curibocos, who combine Cafuzo with Indian blood, and Xibaros, the progeny of Cafuzos and negroes.

Bates uses the indefinite term Tapuya as an equivalent for what he calls "semicivilized" Tupis. Strictly, none have reached this degree of social development, although in some instances there has been a greater or less adoption of civilized appliances. At certain places savages, or barbarians at best, masquerade as cultured men and Christians; but this is all on the outside and strangely altered. Physical type is the same with that of average American groups. An Indian of this family is apathetic, improvident, and incapable of persistent effort, like his race at large. He has its moodiness and reserve, its undemonstrative manner, with that unevolved nervous organization through which any display of feeling becomes explosive. Finally, a mental reach going beyond the possibilities of achieve-

[13] The Races of Men, Lond., 1900, p. 543.

ment. There is no time, even if circumstances could change, in which to realize those momentary inspirations by which he is visited.

It appears impossible to compile a complete list of Tupi-Guaranian tribes. Moreover, no mere catalogue would convey the significant fact that their conditions vary through every grade intervening between nomadic savagery and the state of sedentary, self-supporting, comparatively well-provided communities.

When Cabral arrived, A. D. 1500, he found Guaranis spread from Paraguay to Uruguay, established in southern Brazil, and already united with Tupis. The group so formed were at that time without clothing, though they practiced several modes of personal decoration which their descendants in good circumstances have abandoned, and Nadaillac reports them as living in commercial settlements usually consisting of four long houses built around a square. Tupinambas, Gamoyos, etc., inhabit similar colonies yet, but generally the communistic system has been greatly broken up, and at many places it does not exist among bands belonging to this family. Instead of a hearth for each household, there is a separate dwelling. The tribal organization, where best preserved, no longer retains its former vigor. In some instances an almost complete emancipation of women has occurred.

Among Indios bravos, or their savage brethren, the men still slit their under lips for labrets, paint themselves with red rucu and black genapa, prick in tattoo marks, and irritate scarifications to make prominent scars. These low-caste, sometimes nearly disorganized Tupi hordes, keep up hereditary feuds, plunder or murder wherever they can, avoid any contact with foreigners, and despise their inventions. They are very commonly accused of cannibalism, and, altogether, a much closer bond unites them to Caribs or degraded Arawaks than with higher sections of their own stock. Everything is, as usual, so utterly irregular about this whole group that unity of description would be impossible without an intolerable amount of repetition. Scarcely anything can be stated concerning one Brazilian family, which is not true of some group among others.

The progress of culture in Brazil must be noticed with reference to its main results alone.

This country shows every variety of Stone Age implement "from the rudest paleolithic sandstone wedge up to neatly chipped arrowheads of rock crystal, and the neolithic or polished ax."[14] Inferences drawn from a comparison of men with their works have often been unjustifiably extended; but it is manifest that selection among several materials and choice of the best, together with those modes in which substances are used, go far toward fixing range of faculty and social grade. There is no need to explain why a Botocudo puts wooden

[14] Burton, The Highlands of the Brazil, Lond., 1869, vol. 1, p. 178.

points on his arrows when plenty of shells and bone are at hand, or why Caribs, Arawaks, and Tupis often prefer stone to iron.

These selections, as also the direct evidence given by manufacture, are almost all that is available for an estimation of positive or relative fitness in Brazilian families. Members of each lived at first under natural conditions whose action was little modified by natural or artificial changes—how have they carried out the struggle for existence? Comprehensively, Gessan tribes ceased advancing soonest, accomplished least, represent the lowest degree of life. An average Botocudo dwelling is a bamboo hut, conical in shape, about 7 feet high and 3 yards wide. Its only openings are two narrow apertures just large enough to crawl through, and the interiors of all are thickly coated with soot. Bugré settlements consist of several such structures standing in partially cleared forest spaces, while every trace of ordinary decency is banished from their surroundings. T. P. Bigg-Wither,[15] prospecting among adjacent refuse heaps, found deer, pig, cutia, and monkey bones, the remains of animals killed by "a creature more like an orang-outang than a man."

These natives are not much above 5 feet high—probably 5 feet 4 inches would represent their mean stature—and the lower limbs have usually grown crooked. This race shows the long prognathous paleolithic head, the people wear no clothes, and are indescribably squalid. It is customary to cut their long, coarse, black hair off in front and ornament it with toucan feathers stuck on by wax. Every Bugré pulls out his eyebrows and lashes, twists bands of fiber around the wrists, waist, and ankles, pulls down his underlip with "a huge appendage * * * like a big fir cone," besides adorning himself, if fortune be propitious, by stringing rows of teeth about his neck.

Such people can not form large communities, they would starve. Scattered bands may unite while an emergency lasts, but disaggregation ensues when the pressure is removed. Isolation becomes compulsory when imperfect weapons, unskillfulness in wood craft, and general degradation, make men dependent upon supplies they can only gather from large areas. Botocudos construct snares out of black cipós bark, which prove more effectual against big game than their long, inelastic bows and wooden-pointed arrows. Gourds, bamboo points, sharpened sticks serve in lieu of manufactured utensils, but they have also invented yarn, gourd rattles, and a shapeless tunic—supposed to be defensive—out of material that resembles rough cocoanut matting. Implements of war or the chase exhibit their highest constructive powers, and these are few in number, besides being ineffective. Some foresight and adaptative power is indicated by fashioning pao d'arco arrowheads for different uses; but their shafts are too long, the feathering fails of its purpose, and cabriuba preta makes

[15] Pioneering in South Brazil, Lond., 1878.

a poor bow. These inventions, with stone axes which are counterparts of those belonging to prehistoric Europe, and heavy clubs designed for beating down jungle, comprise whatever has been done in the way of construction by this family; they form, says Bigg-Wither, "the absolute total of all arts and appliances of life among these wretched beings."[16]

His party captured twenty-seven Bugrés, whom they tried to inoculate with civilization by means of soap, combs, and bright-colored costumes. Scrubbings, good food, and every effort at exciting interest or giving pleasure failed completely. Nothing broke their profound apathy, and, excepting one boy, they died one after another in some mysterious way—"from a complaint unknown to us," remarks the traveler.

Little as this family accomplished in any direction, there are some arts that did not develop at all. Their stone axes have no superiority over those found in Minas Garaes, Bahia, Sergipa, or Espirito Santo. Moreover, basalt, quartz, porphyry, even meteoric iron ornaments, implements, and arms, wrought by remote ancestors of these modern Ges, show better work than any they can now do. Many tambaqui (shell mounds) on the Paraná slope or Amazon estuary, have been enveloped by detritus, and are covered with virgin forests which prove a high antiquity for remains occupying their lower strata; yet existing tribes of the same subrace can not rival those who founded them in some important particulars involving judgment, ingenuity, and skill.

The "Botocudo group" is unique in various ways, which admit of separate treatment, but with other families, higher forms of culture are much the same when they come to be regarded in all their branches. Before referring to them, however, certain archæological features remain to be mentioned. Those "vases of elegant design" Burton remarks upon, together with other highly finished objects of different kinds preserved in shell mounds, must be attributed to post-neolithic times. They were found at sites yielding osseous remains of such diverse characters that Kane assigns them to "more than one subrace;" yet there is nothing to show where they belong, and Brazil is a country from which whole peoples have disappeared. A like uncertainty exists concerning certain petroglyphs—"written rocks"—of a different grade from ordinary rock pictures. Mere pictographs abound in various parts of the world. They signify an interest excited in some savage's mind by local events or natural objects. He has, as is the case with many races of primitive men, a strongly developed mimetic instinct, accompanied by some facility for representation, and attempts to record what impressed him under its own form. A wide interval separates pictures from symbols; human beings need to develop greatly before they substitute hieroglyphics for sketches.

[16] Ibid, p. 130.

Those scripts in question are apparently of the former class. Deeply cut upon hard rocks with quartz chisels, no little time and patience were expended on their production. Although known for a long period, these inscriptions have not been interpreted; and beyond the fact that they resemble each other sufficiently to suggest community of origin with some race which must have been more evolved than the present Brazilians, besides being widely spread, nothing can be said except that pictures are frequently associated with these hieroglyphs. Cabral de Almeida described "written rocks" on the Araguaya River, which De Castelnau afterwards copied. Burton saw similar mementoes on the Lower San Francisco, Debret found them in Pará, and they have been observed by travelers at many places along the Amazon, Essequibo, and Rio Negro.

In a mere sketch of cultures, results due to indigenous development are alone of any importance. Coast Caribs, like other Indians, came in contact with various foreign inventions. Hunting was the chief occupation of life, and they manufactured weapons for this purpose which have not been surpassed in Brazil. No South American people made better bows, yet the blowgun was not adopted when its effectiveness with a poisoned arrow had been seen. Again, a Carib will use stone while he can get iron; both instances of neglect being occasioned by an absence of faculty. With reference to this latter material, which exists in large quantities under its meteoric form and as an ore, it may be said that no Brazilians have attempted its use except where strangers had already given the substance an artificial form. Cariban tribes point their arrows with wood, bone, stone, or shell; moreover, these missiles are admirably adjusted to different purposes—knob-headed wooden shafts for stunning small game, and others having diamond-like points, or spike and lance shaped tips, when intended for penetration. The latter are often fashioned from flint, jasper, etc., being smooth, ridged, and barbed, according to their designed employment. They also make fishing tridents, with harpoon arrows so constructed that the buried head becomes detached, leaving its shaft to act as a float.[17] Lance points of like materials and similar patterns are plentiful, as likewise knives, scrapers, pestles, hatchets. These Indians spin cotton, plait fibers, weave several textile fabrics, make baskets, and have become good potters. Clay is put through various preparatory processes for burning, even in some instances to the extent of glazing and painting it, but decorative art stops short at its lower grades. Their bowls, jars, etc., evince no sense of proportion, or the effects given by curved lines, variety

[17] Hermann Myer (Smithsonian Report for 1896) has discussed "the distribution of the bow and arrow throughout Mato Grosso" very fully; but the implications of this treatise are almost wholly ethnographic, as will be the case with all works of a like character. Data of this kind are, however, important, and this author has handled his subject in a masterly way.

and harmony of colors. On the other hand there is much ingenuity shown in those methods by which they prepare pigments, extract vegetable oils, and provide themselves with various accessories to life that are not absolutely needed, such as bone flutes and a rude form of the Æolian harp.

Personal adornments have already been noticed, and resemble similar devices among Arawaks or Tupis—paint, tattooings, scars, labrets, feather capes and headdresses, anklets, and necklaces. Nothing which is done by the two former Indian groups appears to be essentially their own, while the third family can only boast of having carried canoe making further than other natives. It is no small undertaking to fell a stonewood tree, often growing at some distance from the water, and transport it to a place where special work begins; that is to say, slitting its massive trunk and hewing out the first outlines. A hull, being chipped into shape, is put on trestles, and placed over fire to expand it, while straddlers are introduced for the production of curves. Finally bow and stern need filling in with proper planking, and then, having been smoothed, boarded, calked, and otherwise finished off, a montareia is complete.

Neither in design or execution does any Brazilian achievement equal this; but alongside of places where it is an everyday occurrence there may be found people whose best effort at boat making consists in fastening strips of bark together for temporary use; or other natives who have no means of navigation at all. Franz Keller, bewildered by the incongruities around him, and apparently hopeless of giving any consecutive account of special arts, asks "Why of two kindred groups, under the same natural conditions, should one spend half its life on the water while the other * * * can neither build a canoe nor handle a paddle?" It is a strong contrast, no doubt, yet in one direction only, and goes for little in comparison with that offered by Shamas and Caishánas—both Tupis, but one possessing everything Brazilians attain to, and the other being naked wanderers no better off than Bigg-Withers Bugrés.

One may look in vain through Brazil "for those graceful tattoos of South Sea Islanders," remarks Bates. Tucinas upon the Solimoens get so far as a spiral, while not another tribe throughout this country goes further than straight lines or patches. The absence of family traits, as evidenced in economical matters, corresponds with those multifarious social resemblances and differences which have been already noticed. Most houses, properly so called, are alike, and one plantation is indistinguishable from another wherever it may be. Crops all grow amid weeds, fallen trees, or half-cleared scrub, and they are most commonly the same.

Where superstitious fancy scarcely rises above a purely fetishistic form, its creations may here take different shapes, but their character is identical. Wood demons and water devils, impersonations of wind,

thunder and darkness, are generically related throughout Brazil, while the fact that tapir-hump is tabooed here, dolphin flesh there, or wild duck in a third place, merely witness to variations which occur all over the world among people whose mental structures are yet homologous. Religious ideas—conceptions arrived at through successive processes of analysis and abstraction—do not exist. It is often charged against these savages that they have no word in their languages meaning God; but why beings who will worship a bug should be expected to adore The One and Infinite does not appear.

PHYSICAL CONDITION, HABITS OF LIFE, ALIMENTATION.

Great masses of mankind may maintain a moving equilibrium on the same plane; they may progress through more and more varied and complex adjustments to their surroundings, or may fail and perish from want of power to do either. Brazilians are in the last class, and to comprehend their decadence it is requisite that something should be known of environing circumstances—where and how they live and what is the general physical and mental condition. "Everything essential when comparing men with animals," again presents itself "when men are compared between themselves." [18]

Nutrition underlies that series of activities called life, and affects all their manifestations. Food is the first and most universal necessity among living beings. Throughout nature, differentiations of every kind mainly subserve means for procuring it. In the beginning human societies take shape from its supply, and they never escape this controlling influence. Want of sustenance drove mankind to those changes of place during which their transformations occurred, and if it be permissible to individualize one factor as having predominantly acted towards making all aggregates what they are, food comes first. There is little exaggeration in saying that culture history commenced with hunger.

Regarded from this point of view—i. e., as purveyors of sustenance—Brazilian Indians are evidently unfit. Organic defects put their physical and psychical natures at variance with surroundings. Whatever potentialities may exist in their race, the fact remains that here defective nutrition saps the requisite power to contend against such strains as are imposed by situation. What is commonly eaten fills out forms without imparting corresponding strength. It does not provide reserve force for body or mind. Spanish and Portuguese taskmasters never understood how men more vigorous in appearance than their own peasantry could die from exertions to which the latter would have been fully equal, and still less did these strangers comprehend that innutrition was able to make mental depression as deadly as the worst forms of epidemic disease.

The majority of these natives spend their lives in looking for some-

[18] Topinard. Anthropology. Lond., 1878.

thing to eat, and they exercise their best faculty in devising means by which it can be obtained. Regular agriculture is only prevalent among a few tribes whose food returns are always uncertain, while many remain altogether dependent upon spontaneous productions. In all cases good food is certain to be made indigestible through bad methods of preparation, and it goes without saying that sanitary laws will be disregarded by savages or barbarians in gratifying any appetite. These tropical Indians, moreover, habitually live more immorally than Northern groups, and, if not given to alcoholic excess in greater measure, have opportunities for indulgence which the former are generally without. Constitutionally feeble, they support those vicissitudes that life constantly entails less successfully. It is a very serious matter for them when crops fail or fish forsake long stretches of water. Without statistics we know what must happen in case turtles fail to arrive, the game migrates, or anything deprives them of some important article of diet. Contingencies of such kinds never occur without disaster. Natives of the whole Amazonas area are not only so liable to endemic disorders that many observers have supposed them to be as yet unacclimatized, but no one can overlook the singular fact that any considerable change in place is more dangerous to their health than is the case with resident Europeans. Thus endurance without removal ends badly, or escape involves conditions which can not be safely encountered. Poor habitations, squalor, vicious excess, malnutrition leave men very defenseless who have done little toward placing themselves beyond the direct action of natural selection.

It remains to see how they live. The list of folk foods is a long one, but they do not all occur together, and no single community enjoys the benefit of much variety. In almost every instance starchy or saccharine substances greatly exceed those vegetable aliments containing nitrogen, while among diets of animal origin fish is generally substituted for flesh. This has never been done successfully anywhere, so that, upon the whole, alimentation would be inferior even if its constituents were used in such a way as to give all those advantages they could possibly yield.

In illustration of irregular food distribution, several valuable species of fish are confined to distinct regions—pin bread is hardly heard of outside of the Uruguay and Parana basins, and cangrejos, a nutritious and much-esteemed crayfish, only lives in the Plata. Throughout its drainage area wild guavas, as Asara remarks,[19] "are eatable, and that is all." It is only neutral zones lying between dense forests and sun-scorched plains, that abound in varied natural growths or give good returns when cultivated. Everywhere else supplies are scant, scattered, unvaried, and inconstant. Yet most tribes have been forced into forests, because spontaneous productions were greater than those of the rolling campos, and in these woodlands they are principally con-

[19] Voyages dans l'Amérique Méridionale. Paris, 1809, Vol. I, p. 138.

gregated on their streams. Karl von der Steinen found fish to be all that people at Yaulapiti, Kamayura, and other sites had to eat in the way of animal food, excepting "some little miserable creatures thrown into a fire without being skinned and devoured half charred and half raw."[20]

Most observers remark upon the want of wild honey in these vast Brazilian woods, though Bigg-Withers states that immense quantities are made by the Mirim bee, and it is a fact of very considerable importance to savages whether they have it or not. They are provided with Manihot, however, as also with Pacovas—fruit of the uncultivated banana—Assai, Mirili, Tucuma, and Mucujá. Certain degraded bands—those living in the Ivahi basin, for example—do not use tobacco, although it is indigenous there, and would prove valuable as an accessory to such a diet as theirs. Similarly, Botocudos and other nomads of the Xingú, Tapajos, Purús, Teffé, Javari, eschew pure salt, accumulated at salinas on those rivers, and extract saline matters from ashes, or eat dirt impregnated with them.

The berries of Chrysobalanus icaco contribute to sustain life; wild cherries and plums also; melons, calabassas, pineapples, Juhati beans, papaws, together with the fruits of palms, bigonias, and anonaceous plants.[21] All pine forests produce many legumes which afford important aids to subsistence, notwithstanding that Azara depreciates the nutritive value of those growing in Amazonia. Hymenœa seeds furnish a poor flour. There are Oiticia, Bakayuva, Brazil nuts, with dates of Altalea excelsa, and a great variety of parasitic Bromelias, Billbergias, Achmeas, Tillandosias, etc., all producing food. Pot herbs grow sparsely in shaded tracts; neither do the Solonaceæ, so all important elsewhere, contribute much toward supporting these populations. But they find many edible gums and resins, Agave fruit, maize, Jatropha, gourds, pumpkins, plantains, cashew nuts, with forms of Colloquintidæ, Onotherea, Mimosæ, and Erythroxylon, that afford nutriment. Cultivated species are naturally the more valuable wherever they exist; nevertheless, Brazilian Indians do not, as a rule, subsist upon their crops.

Many preparations partly or wholly composed of wild products are in use; yet there is a class of natives who know nothing about cooking, and at most merely boil birds, fish, or small quadrupeds, without any addition or seasoning. A number of tribes have no vegetable food except indigenous fruits. Among most communities, however, even the larva, insect, reptile-eating ones, condiments are employed, and stimulants also. Human stomachs revolt from insipidity and sameness; they crave piquancy, succulence, and, above all, variety. Thus those vegetables referred to, with cultivated forms and a long list of wild growths omitted in the former imperfect enumeration of

[20] Unter den Naturvölken Zentral-Braziliens. Berlin, 1894, Vol. II, p. 314.

[21] Acosta. Historia Natural y Moral de las Indias. Madrid, Lib. IV, Cap. XXXV.

folk foods, are mingled, mixed with meat, and eaten as soups, gruels, chowders, stews, and hashes. In fact, made dishes are the rule, except with very degraded peoples. Tasteless farinaceous polentas get some flavor from crude sugar, verdigris, sarsaparilla, etc. Rice, yams, sweet potatoes, tomatoes are boiled together and seasoned in all kinds of extraordinary ways. Dried meat is eaten with lime juice; black beans are cooked in corn-meal mush, while Burton describes Feijoada, or farinha and beans, flavored by toucinho oil and pepper, as "the staff of life" at many places. On the Rio das Velhas, Indians make gruel of manioc flour, farinha, and cinnamon. Along the Ceara and Piauhy they put Acantacari pinguis into most kinds of boiled meals, while both in the Rio de Janeiro and Pará regions, grated Coco da praia is used as a substitute for this last-mentioned oily substance.

Other natives mingle Mani maize flour with aromatic balsams. Nomads of "the closed forest" (floresta fechada) season monkey stew with tacupi—boiled mandioca juice, capsicum, and small fish. Manihot fecula with its starch unprecipitated and pepper, is a Pará sauce, while black tucupi consists of this latter inspissated and mixed with mashed Sauba ants. Iguana or alligator eggs are beaten up in any kind of flour on the Lower Amazons, where it is unusual to eat vegetables by themselves. The peppers—Pimenta de cheiro, Jua, Pimentão, Cheiro comprido, Cheiro doce, Quiya-ocú, and Quintum-quintum, which is so strong as to be "almost a poison"—are put into almost every dish.

Tobacco is smoked and snuffed to excess. Most Tupis also use an intoxicating powder of Inga seeds that is very deleterious. Omaguas and other tribes of the Orinoco narcotize themselves with comminuted Floripondia and Curupa seeds; moreover, snuff made from dry Erythroxylon coco leaves is a favorite lethal agent among many groups very dissimilarly situated—as well-provided Juris and destitute cannibalistic Miránpas. There are also stimulants in profusion—banana beer, cane spirit, fermented Paullinia sorbilis, and Manioca cakes. The rou of Indians living in that hot, moist country above the Amazon and Rio Negro, confluence is nothing but bad rum. It is a beverage not adapted to the climate, and this fiery liquor adulterated with ethers and aldehydes through imperfect distillation simply destroys people. Chicas (sherberts, or fermented drinks) can scarcely be enumerated. Communities incapable of nearly everything else still find substances to ferment—grains, seeds, a great variety of palm nuts, pineapples, plantains, mandioca, the Cará tuber, oranges, jabuti-puhé, purumá-i, cunea, umari, wishi, etc. Caishánas, who represent the very dregs of humanity, get completely mad with ginger steeped in Cashaça rum, and Brazilian highlanders intoxicate themselves with wine of Anacardium nuts, of Lecythis ollaria and Olũ moguilia. They redistill rum, or rectify Cachaça spirit a third time, and the effect of this upon such men as these may be imagined.

Animal foods among native families seem numerous; but, like

those of vegetable origin, these do not exist together, and there is no place in Brazil where people are well provided with meat. Armadillos avoid marshy ground, while Sus-palestris—the wild progeny of domesticated swine—will not live anywhere else. American ostriches and deer of the plains never enter wooded country. Tapirs and capybaras are only found near large bodies of water. Various birds solely inhabit open country. Others—penelopes, doves, pigeons, parrots, parroquets—together with all Cebidæ, bears, squirrels, opossums, and raccoons, live scattered about in forests. Momentous consequences attend such diversities in food distribution. With primitive men they come near to implying what Daireaux calls "physiological transformations."

These Indians, excepting those best provided—or, more plainly, the large majority of them—are often driven to foul feeding, and subsist in large measure upon larval forms of land or water—snakes, lizards, insects, vermin. They dredge the mud of those innumerable streams between the Parana and Magdalena for their vast stores of low organisms—worms, anthropods, etc.—eating anything alive. Forests here are poor in large game, but secluded river tributaries and lakes, harbor immense numbers of waterfowl, which, with their young and eggs, contribute toward keeping up vigor of body and mind.

Human interference has lately effected great changes in food-producing species, both animal and vegetable. Imported plants especially, which, through previous cultivation, were prepared to compete successfully with indigenous growths, have spread on a far grander scale than those who introduced them could have anticipated; but as native productions were extirpated in extensive spaces, their earlier tenantry of birds and quadrupeds disappeared also. This is the case to a minor degree among woodlands; but at best Brazilian forests yield very precarious supplies. Early Spanish explorers starved there, as witness their own narratives, and Groot's account of Quesada's expedition to the Magdalena in 1536. Nevertheless edibles of some kind exist in most places, though never abundantly or constantly, which is the reason why population gathers on those water courses, which always afford some means of support.

Lists that are misleading, because they enumerate creatures widely scattered and often few in numbers, as if these woods were regularly stocked, have been prepared by many travelers. Peccaries inhabit forests with porcupines and the amphibious tapir. So likewise most species of rodents, monkeys, sloths, ant-eaters, marmosets, and kinkajous. Armadillos and iguanas are found there; mateiros, or white-tailed woodland deer, with another animal of this order called catingueiro—"stinker"—while feral forms of once domesticated cattle and hogs abound in certain localities. All those birds most important from an alimentary point of view live among trees. The jacutinga, "in size and appearance something between a turkey and pheasant," corvo d'agua, a dark-green ibis much prized for its flesh

quantities of wild ducks, the partridge-like urie bird, together with hambu, crypturus, arassaris, crax globicera, and tocano pacova. Natives about Ega may almost be said to live on curl-crested toucans during June and July, but parrots or parroquets are, perhaps, more generally eaten throughout Brazil than any of those mentioned. Psophia and palamedea species also aid in feeding these Indians, as likewise tataupas, ypacahas, yahanas, mbatuitis, and chloritos forms. They eat nearly every feathered creature, however, from a gull upward, deriving great advantages from migratory birds that come to breed.

Large streams, their affluents, and the lakes, ponds, and partially submerged marshes which lie near them contain various supplies such as they are. Properly cooked and served many of these would be delicacies; as it is, their nutritive value (excepting that of the larger fishes) is not of a high grade, and they soon pall upon the appetite to such an extent as to be positively hateful, thus losing much of whatever importance actually exists, because disgust checks assimilation. Even half-starved savages soon begin to loathe turtle flesh, oil, and eggs; yet these with fish are always more plentiful than other articles of animal food, and to people subsisting on them, or on mussels, frogs, crabs, and oysters, to a certain extent exclusively for lengths of time, they become detestable. Fishes differ very greatly in nutritious qualities, much more than any mammals; but strength-giving or not, as the case may be, it is undoubtedly true that what Bates calls "a meager diet of fish, wild fruits, and mandioca meal" supports most tribes. Those other aquatic species already indicated, with marsupial water rats, river boas, manatees, otters, and alligators, are exceptional aids to existence. Camurupine, mirine, assú, tubarana, bagre de ouro, robaldo, pecamon, sardinhas, serapos, sibeiras, etc. (fresh, smoked, or salted), are everyday aliments.

The Indian populations reviewed are predominantly of an "American type;" intermediate between parent stocks clearly represented in this country. Their physical traits and social states have been noticed so far as space allowed, and it hardly need be said that present conditions are due to inheritance, and adjustment with those environments existing in any instance. No Brazilian has raised himself much above savagery; therefore it was intended to indicate the main reason for his immobility by showing how he lived and by indicating conditions which necessarily controlled evolution. Most of that culture history already referred to gathers round alimentation, and since undeveloped powers are matters of speculation, legitimate deductions from what has been stated concerning supplies will give most all the light it is possible to cast upon the social phases of native families.

Partly from their incapacity, and partly because natural resources failed, the universal need for sufficiency with variety could not be gratified; thus all groups resorted to expedients (many of which were injurious) for relieving distressful states thus occasioned—deterio-

rated systemic conditions, with more special enfeeblements of body and mind. Even if the chemical composition of aliments had been efficient, they must have fallen short through nonadaptation to "the psychology of nutritive needs," and hence the common resort to sauces, stimulants, and narcotics. More pleasure in eating and more power to digest were vital necessities for strengthening nerves of sensation or motion, giving tonicity to cerebro-spinal centers, and imparting energy of an intellectual or emotional order. These tribes were never properly nourished; hence the stomach hampered the brain and the brain the stomach; hence, also, to a great degree, after some uncertain steps toward improvement, they stood still and began to die.

It is with agriculture in an evolved state that "the strength, solidarity, and expansion of nations commences."[22] These men, however, halted a degree below hunting tribes—they were essentially fishermen. As a rule, animal foods here did not belong to the best classes, and those which could be obtained furnished too little albuminose, fibrine, phosphates, or blood salts generally. Briefly, they had the poorest kind of nutriment belonging to inferior classes. In the long run it did not do its part toward balancing waste, or accumulating reserve force. This failure to subserve the essential purposes of food was accentuated by bad cooking. No savage lives well, whatever his resources may be. Everything is eaten in a condition that makes its complete conversion impossible.

Strictures such as the above apply to their vegetable diet likewise. Brazilians subsist upon plants too exclusively, and among human beings whose supplies are drawn directly from nature, and appropriated in a very slightly modified form, this regimen imposes an undue strain upon digestive function. It not only uses up energy requisite for other vital activities, but yields less perfect results for the work done. Thus normal equilibrium is disturbed. On one side detrimental results come from impoverished blood with its physical accompaniments of shrunken muscles and atonic nerves; on the other it is coordinated with mental failure in its widest meaning. Their plants, speaking generally, are not of the best quality, to begin with, and much that they contain is wasted. Nitrogen determinations may easily misrepresent the nutritive value of vegetable matter. Tissue-forming, force-giving constituents become measurably useless through faulty preparation; either baffled in action by mechanical obstacles or interfered with from constitutional causes. The implications of these truths seem obvious, and no one is likely to understand the anthropology of Brazil without taking them prominently into account. The sociological state of its inhabitants must be in correspondence with biological and psychological development. Both have been determined by conditions among which the food supply they were able to command occupies a foremost place. In every aggregate the outcome of all efforts, all vital activities, expresses nothing but those

[22] Arago, Plantas Alimenticias. Madrid, 1881. Vol. I, p. xxiii.

kinds and degrees of action possible with its units, and dependent upon the grade of life these attain. Force and action must be correlative. Practical existence is a compromise between possible performance and what surroundings contribute toward carrying out performances of all kinds. The omnipresent food influence only ceases to be omnipotent when men have done more than Brazilians were able to accomplish, namely, establish and partially control an artificial environment.

Similarly, where attempts in this direction have been abortive, as is the case here, those states engendered by privation are organized in body and mind. An Arawak can not be prudent, industrious, or self-controlled, without hope of reward. Altruistic feelings are impossible when each man's whole endeavor is required to keep himself alive. Nowhere on earth has the cult of benignant deities coexisted with a condition of semistarvation. Furthermore, resistance to shock or strain is proportional with strength, and Tupis have none to spare when any of those innumerable emergencies to which they are subjected break in upon life's usual course. This is why these devitalized beings die so easily.

It has been shown that the tendency to death is excessive in Brazil, where social organizations are rapidly breaking down; but "the entire framework of each man is the result of a whole history of all his life; of what he is, and what makes him so—of his forefathers; what they were, and what made them so."[23] No such account of Brazilian families can be given; nothing more than an outline of their constituent race elements, physiographic situation, and peculiar circumstances of life. Plainly, however, these latter forced all to strive toward a single end almost exclusively. They never surmounted initial difficulties so as to find an opportunity for doing anything besides feeding themselves, which was done in ways and with results already stated. None are primitive men; the whole have emerged from lower states; but beyond anything that can be pointed out as controlling progress, much remains which is indistinguishable. All the man is not manifested by his works; nor in laying stress upon a factor of existence so all-important as alimentation, was it intended to convey the idea that everything connected with those arts or cults indigenous here could be divined from dietaries. Between the hook, hoe, arrow, or spear there is something which neither implements nor economic habits explain; yet it is certainly true that the tribes in question have mainly evolved through correspondences with plant and animal distribution. This may not reveal the amount of faculty these Indians could have exhibited under any circumstances, but it indicates a sufficient cause for existing limitations. Brazil is a country where compulsory deprivation and isolation give an especial significance to the aphorism that "a man is what he eats," and evidence converging from many sides seems to show that these men could not have been otherwise than as they are while forced to live as they do.

[23] Bagehot, Physics and Politics, New York, 1874.

CHAPTER IV.

CONSTITUTION AND GOVERNMENT.

Until 1889 Brazil was a hereditary constitutional monarchy of the English parliamentary type, apparently decentralized, as the provinces had their presidents and legislative assemblies. But in reality the *acto addicional* (additional act) of 1834, which had established the decentralization, was set aside in practice and Brazil became a centralized empire, where the influence of the court exclusively prevailed. With the change of government a real federation was established, which has given excellent financial results and allows to the former provinces, now converted into States, the free development of their resources. The new government was modeled after that of the United States, with many important differences, as may be seen hereafter.

The executive power is vested in the President of the Republic, who is elected directly by the people for a term of four years. Elections take place on the 1st of March of the last year of each presidential period. The Vice-President, who is elected at the same time as the President, is by virtue of his office President of the Senate, which is composed of 3 Senators from each State, elected directly by the people. The Chamber of Deputies is composed of representatives elected directly by the people, 1 for every 70,000, with a minimum of 4 Deputies for each State. The total number of Deputies at the present time is 212, and 63 Senators. Congress meets annually on the 3d of May and sits four months, but may be prorogued or convoked in extra session. Every three years elections occur for all the members of the Chamber of Deputies and for one-third of the Senate, whose members are elected for a period of nine years.

All citizens over 21 years of age exercise the right to vote, with the exception of beggars, illiterates, soldiers on pay, monks or members of monastic orders subject to vows which imply the surrender of individual liberty, and those who, for whatever reason, have lost, either permanently or temporarily, their rights as citizens.

The President appoints and removes at will the Cabinet ministers. They have no political responsibility and can take no part in the Congress, but must present their annual reports to the President. The Cabinet is composed of six departments, to wit, Department of Finance, Department of War, Department of Industry, Railways, and Public Works, Department of the Interior and Justice, Department of the Navy, and Department of Foreign Affairs. Public

instruction comes under the Department of the Interior and Posts and Telegraphs under the Department of Industry, although in the early days of the Republic they formed two independent departments. The President can not be successively reelected, and by virtue of his office exercises supreme command over the Army and Navy; he can declare war and make peace when previously authorized by Congress, but in case of a foreign invasion of aggression he is empowered to declare war at once. The Constitution authorizes the Government to declare war only "if there can be no recourse to arbitration or in case of failure of this," while it states positively that in no case shall the United States of Brazil engage in a war of conquest.

The President appoints all the Federal officers, the members of the Federal Supreme Court and ministers of the diplomatic corps, subject to the approval of the Senate. He has also the right to sanction and promulgate the laws and resolutions of Congress, and issue decrees, instructions, and regulations for their faithful execution, and is invested with the veto power, which can be overruled only by a two-thirds vote. The President has the power to pardon crimes and commute penalties for offenses subject to Federal jurisdiction, but to the National Congress belongs the power to commute and pardon penalties imposed upon Federal officers for offenses arising from their responsibilities.

The Senate has the power to try and pass sentence upon the President in cases of crimes of responsibility, and the Federal Supreme Court in the case of common crimes. The Chamber of Deputies decides whether or not to proceed in charges against the President.

The States of Brazil are twenty in number, their constitutions differing little from the Federal Constitution, that of Rio Grande do Sul showing the widest divergence, having been drawn up under the influence of the positive school of philosophy. This school predominated in the first councils of the Republic, employing its holidays, flag, and official formulas, in addition to the spirit of rational obedience, or obedience within the limits of the law, which exercised a harmful influence upon the discipline of the Army. The Federal district, formerly the neutral municipality, where the capital is situated until the proposed new city is built on the plateau of Goyaz, is represented in the Chamber according to its population, while it has the same number of Senators as the States.

The simultaneous elevation of the provinces to States respected the historical traditions, but at the same time it sanctioned great geographical differences; very small States, such as Alagôas and Sergipe, with an area of 58,491 and 39.090 square kilometers, respectively, being grouped with Amazonas and Matto Grosso, with an area of 1,897,020 and 1,379,651 kilometers, respectively. Provision is made in the Constitution for the union of two or more States in one, or their subdivision. The Union does not enjoy the privilege of organ-

izing territories, to be elevated to States, but to these latter belong the unoccupied lands lying within their respective boundaries, and to the Union only as much territory as may be necessary for the defense of the frontiers, for fortifications, military works, and Federal railways.

The States enjoy as much autonomy as is compatible with the preservation of the Federal authority, and they are forbidden to make or declare war one with another, to reject the currency of the Union, or to refuse to recognize public documents of the Union of a legislative, administrative, or judicial character. The cases of intervention of the Federal Government in matters pertaining to the States are clearly defined in the Constitution. They are (1) to repel foreign invasion or the invasion of one State by another; (2) to maintain the federative republican form of government; (3) to reestablish order and tranquillity in the States at the request of the respective governments; (4) to assure the execution of the laws and Federal decrees.

The Constitution of Brazil is extremely liberal, recognizing the right of free association and assembly; the right to petition the Federal authorities; liberty of speech, of worship, and of the press (anonymous publications are forbidden); the inviolability of correspondence and of the home. The Constitution does not recognize privileges of birth or titles of nobility and abolishes all honorary orders, with all their prerogatives and decorations. It abolishes the death penalty, except in cases under military law in time of war; the penalty of the galleys; that of judicial banishment, and passports. Compulsory recruiting for military purposes is substituted by voluntary recruiting without bounties, or if this means be not sufficient, by lot, previously determined. It is stipulated that every Brazilian shall be bound to military service in defense of the country and the Constitution. In regard to citizenship, the Constitution states that the following shall be Brazilian citizens: (1) Natives of Brazil, though of foreign parentage, provided the father be not in the service of his nation; (2) sons of a Brazilian father and illegitimate sons of a Brazilian mother, born in foreign lands, if they take up their residence in Brazil; (3) sons of a Brazilian father who may be in another country in the service of the Republic, although they do not make their domicile in Brazil; (4) foreigners who possess real estate in Brazil and are married to Brazilian women or have Brazilian children, unless they shall declare their intention of not changing their nationality; (5) foreigners naturalized in conformity with the laws of the Republic.

At the time of the proclamation of the Republic there was issued a decree called the "Naturalization decree," according to which all foreigners living in Brazil at that date were considered Brazilians unless they made a declaration to the contrary at their respective consulates. Foreigners who have become naturalized citizens are eligible to all positions except those of President and Vice-President.

The States are subdivided into municipal districts, whose rights and prerogatives are exercised by a municipal council and a prefect, who is the chief of the municipal executive power, to whom belongs the power to enforce the resolutions of the municipal council which have been duly promulgated. But this plan may be changed, as the States have the power to adopt their own system of administration.

The judicial power of the Union is vested in a Federal Supreme Court, composed of 15 justices, who hold office for life, and inferior Federal courts, distributed throughout the country. To the Federal Supreme Court belongs the duty of trying and judging the President, the Cabinet ministers, and ministers of the diplomatic corps; cases and disputes between the States and the Union or between the States, one with another; litigations and claims between foreign States and the Union or between the States; conflicts between the Federal judges or courts, one with another, or between these and those of the States, as well as those between the judges and courts of one State and those of another; finally deciding, on appeal, questions pronounced upon by the lower Federal courts and tribunals and decisions of the State courts in last appeal when the validity or application of the Federal laws is called in question. It also reviews the proceedings of finished trials and grants habeas corpus by appeal. One of the justices of the Supreme Court is made Attorney-General of the Republic, and each State has its sectional attorney.

Each State, in addition to the district judges, who, as in the case of the State of Pernambuco, are elected by the municipal council, to whom belongs the duty of trying and judging civil cases that come under their jurisdiction, making corpus delicti, granting provisional bail, etc., has its judges of law to whom appeals are made by the district judges, and a Supreme Court of Justice. The public prosecutors or solicitors represent the prosecution. In the Federal district the justices of the peace, who are elected by the people, are substituted by 21 pretors, who preside over the correctional courts. For military crimes there is a special court, composed of the military supreme court, whose members hold a life position, and of councils of war. The Constitution also instituted a court of accounts, which has been in operation since 1893, for the settlement and examination of all public accounts before being sent to Congress.

After the judiciary had been organized in accordance with the new Constitution Brazil began the reformation of her codes. The preparation of the criminal code was intrusted to a special commission of the Chamber of Deputies, which has already accomplished its task. The drawing up of a civil code has been several times attempted, as the civil legislation of Brazil is still constituted by the old Portuguese legislation as regards the rights of the private citizen, modified by the laws which have been promulgated since the independence, such as those upon the abolition of birthright, secularization of property

in mortmain, right of succession of illegitimate children recognized before marriage, patents, etc., civil marriage, bankruptcies, etc. Congress is now discussing the project of a new civil code.

The commercial code dates from 1850, with subsequent modifications, and the penal code at present in force was promulgated in 1890 by the Provisional Government in substitution of the code of 1830. The States have the power to organize their codes of procedure.

As regards international law, Brazil follows the general principles of the law of nations. In 1856 it adhered to the regulations on privateering adopted at the Congress of Paris.

Nearly all the treaties celebrated by Brazil have been either boundary or extradition treaties. An extradition treaty with the United States was negotiated at Rio de Janeiro by the United States minister, Mr. Thompson. There are commercial treaties in force with different South American Republics. The reciprocity treaty signed at Washington in 1891 ceased to have effect in 1894.

Brazil forms part of the Postal Union, and has signed at various international conventions, among others, the telegraphic convention, the convention for the protection of industrial property, the protection of submarine cables, publication of customs tariffs, marine signals, etc. Brazil recently signed treaties with Chile and Bolivia for the free exercise of the liberal professions by the citizens of one country within the boundaries of another.

Foreigners enjoy the same civil rights and commercial immunities as Brazilians, including the right of trade-marks and patents, except the privilege of ownership of vessels for the coast trade, which, by the Constitution, must be carried on exclusively under the Brazilian flag. Copyright is not yet accorded to foreign literary productions except when stipulated in special treaties.

The Brazilian Army is formed by volunteers who enlist for a period of from three to five years, which can be renewed for equal subsequent periods. At the end of the period of enlistment each volunteer has the right to a concession of 189 acres of land in the Government colonies.

There are now 14,658 noncommissioned officers and privates in the Brazilian Army, forming 40 battalions of infantry, 6 battalions of siege artillery, 6 regiments of field artillery, and 14 regiments of cavalry. If the views of the Minister of War are adopted, the infantry will be reorganized into 20 regiments of 2 battalions each with 3 companies to each battalion. The regimental officers will be 1 colonel, 1 lieutenant-colonel, 2 majors, and a quartermaster with the rank of captain. The company commissioned officers will be 1 captain, 1 lieutenant, and 1 ensign. This will give 23 commissioned officers to each regiment. Unemployed officers will be attached to the general staff. No foreigners are admitted either to the Army or to the Navy.

The Minister of War gives his orders to the Army through the

adjutant-general, under whom are the subordinate commanders of the 7 military districts into which the country is divided, with headquarters in the capitals of the principal States. The quartermaster-general has charge of the war material. The armament has been recently renewed, a modification of the German Mauser of 1888 being adopted for the infantry. Cannon and other artillery ammunition are made by Krupp. Under the War Department are a number of auxiliary departments, such as the department of military works, the military intendency, and the military technical commission, besides the arsenals in the Federal Capital, Rio Grande do Sul and Matto Grosso. A soldiers' home, established near Rio, is open to all soldiers who have become disabled in the service of the country. Military instruction is furnished in the schools of the regiments. In these schools there is a preparatory course, a general course, and a practical course in infantry, cavalry, and artillery. There is also a military college for the sons and grandsons of officers and professors of military schools and schools of practice in the Federal Capital and Rio Pardo (Rio Grande do Sul).

The military school has two courses—a general course, which includes theoretical and practical studies in infantry, cavalry, and artillery, and a special course for officers, who, after having been approved in all the subjects of the first course, may wish to be classified among the staff officers of first class and engineers. The first course is three years and the second two. There is a school at the capital that is preparatory to the school of practice at Realengo and another at Porto Alegre, preparatory to that of Rio Pardo. In these schools practical instruction is given in the three arms which is indispensable to matriculation in the Military School of Brazil.

According to the recent reform proposed by the Minister of War (1900) there will be: Regimental schools (1 for each district), 7 preparatory schools, 2 war schools, 2 tactic schools, 1 military college and High School.

There are powder mills and pyrotechnical laboratories in Rio de Janeiro and in Matto Grosso, and a factory of arms in Rio de Janeiro. The Estrella factory (Rio de Janeiro) furnishes all the powder required by the Army. All the ammunition has heretofore been manufactured in Germany, Belgium, and France.

The Congress has passed a law authorizing the Government to reorganize the military establishments of instruction, giving more prominence to practical studies.

The naval administration is intrusted to the respective minister, who is assisted by a consulting naval council and the adjutant-general of the Navy. The personnel of the Navy consisted in 1899 of 1 admiral, 2 vice-admirals, 10 rear-admirals, 18 commodores, 30 captains, 60 lieutenant-captains, 175 first lieutenants, 160 second lieutenants and ensigns, in addition to the medical corps. The commissary depart-

ment employs 190 men. The national sailors number 2,000 and the marine infantry 300.

The naval school's course of instruction comprises seven years, including theory and practice, after which a long voyage is taken. There are other schools of machinists, artillery, torpedoes, etc.

The marine arsenals are three in number, and are situated at Rio de Janeiro, Pará, and Ladario (Matto Grosso). The arsenal at Rio is the only one engaged in the construction of war vessels. The modern cruiser *Almirante Tamandaré* was the last to go out from its docks. The service of hydrography, meteorology, and light-houses comes under the Navy Department. There are 101 national light-houses. Each State along the coast has a captain and officers to do the police duty of the ports, who have charge also of the placing of buoys, inspection of the light-houses, preservation and pilotage of the bars and ports.[1]

The Brazilian Navy consists of 8 ironclads, 9 cruisers, 3 torpedo cruisers, 5 gunboats, 9 dispatch boats, 3 transports, 10 torpedo boats, 3 tugs, 2 auxiliary steamers, etc.; 58 vessels in all.

By an Executive decree the naval force for 1901 shall consist (1) of the regular officers of the Navy and subordinate departments; (2) of cadet midshipmen to the maximum number of 180; (3) of a force of 4,000 national sailors, including 300 men for the three companies unattached and 100 for the company of the State of Matto Grosso; (4) of 700 men to be enlisted in accordance with the regulations promulgated for the supernumerary force; (5) of 1,500 sailor apprentices; (6) of 450 men of the marine corps; (7) in time of war of double the number of men mentioned in sections 3, 4, 5, and 6.

Marines and ex-sailors who shall enlist and serve for more than three years and then reenlist for at least two years more shall have the right at each enlistment to the value in money of the uniform which is distributed free of charge to recruits.

[1] **La République Brésilienne, pp. 76–101, and reports of Ministers of War and Navy for 1897.**

CHAPTER V.

POLITICAL DIVISIONS—THE FEDERAL DISTRICT—RIO DE JANEIRO.

The Republic of the United States of Brazil (Estados Unidos do Brasil) is politically divided into 20 States and a neutral territory called the Federal district, which is administered by a council elected by the citizens of the district; the municipal executive authority being exercised by a prefect or mayor appointed for four years by the President of the Republic. The area and population of these divisions are given on page 7.

The Federal district is the most thickly populated portion of Brazil. With an area of 1,394 square kilometers it has a population in round numbers of 677,000. Almost the entire district is occupied by the city of Rio de Janeiro, which is not only the most beautiful city in Brazil, but also the leading one in commercial and social importance, being the capital of the Republic. Although a very cosmopolitan city, having a number of large and influential foreign colonies, it nevertheless preserves its distinctive Brazilian character and is one of the most intellectual centers of Latin America.

The city extends along the west shore of the bay of Rio, on the same side as the famous Pão d'Assucar (Sugar Loaf) Peak, from the foot of which extends a peninsula containing the fortress of São João, while on the peninsula on the other side of the entrance is the fortress of Santa Cruz. Between these is a small island containing Fort Lage. A channel 900 meters wide between Fort Lage and the fortress of Santa Cruz affords a passage for vessels to the inner harbor. Overlooking Santa Cruz is another peak, also fortified. Within the bay a short distance from the entrance is still another fortress on the island of Villegaignon, on which, in the sixteenth century, a French adventurer established the so-called "Antarctic France."

The main body of the city of Rio de Janeiro comprises an area of about 2 square kilometers. It is limited on the south by the morros Castello and Santo Antonio and on the north by São Bento and Conceição. Into this small space, divided into regular squares by long and narrow streets, are crowded the residences and public buildings. Vehicles have much difficulty in traversing this portion of the city which is the business center, yet there are street-car lines on all the principal streets. The street-car service is the best, cheapest, and almost the only means of transportation in the Federal capital. In 1897 the lines of the different companies, some of which use horse

power and others electricity, carried 83,000,000 passengers. The length of the lines within the city limits is 283 kilometers.

For a long time the city has been spreading, until now it extends along the shores and far back between the hills which overlook the bay, absorbing the small surrounding towns. Reclus[1] compares Rio de Janeiro to an immense polyp, the original city corresponding to the body and the various ramifications to the enormous tentacles. The length of the city from one extremity to the other equals that of the largest cities of the world. From the boundary of Gavea on the Atlantic to that of Cajú on the bay or of Cascadura, the terminus of the suburban car line, the distance by the most direct route is 28 kilometers, and the growth of the city tends to still greater length. The entire space covered by the city equals that of any other capital, but a large part of this is occupied by hills or knolls covered with forests. The number of buildings is approximately 50,000, and its two finest residence districts are Laranjeiras and Botafogo. The first is situated in the picturesque valley at the foot of Corcovado Mountain, from which may be had one of the most splendid views in the world. At this point starts the aqueduct built in the eighteenth century by one of the viceroys. Botafogo is built around an arm of the bay, which at first view gives the impression of a placid lake, being nearly circular in form with a very small entrance. The residences in these and some of the new districts have a distinctive architectural character and are surrounded by beautiful gardens in which tropical plants grow in all their exuberance.

The former Imperial Palace of Boa Vista in the district of São Christovão, now the National Museum, is surrounded by beautiful gardens. On the other side of the city, beyond the lagoon Rodrigo de Freitas and near the ocean, is the Botanical Garden. In the old part of the city there is also the park of Campo de Sant' Anna, formerly Praça 15 de Novembro, which was designed by a Frenchman. Around this park are grouped several of the finest buildings of the city, the Quartel-General, an immense structure without architectural beauty, the Central Railway station, the Senate, Mint, City Hall, Normal School, etc. Near this is the Palace of Itamaraty, bought at the time of the proclamation of the Republic for the head of the Provisional Government and now used for the Department of Foreign Relations. The present Government Palace is in the populous residence district of Cattete, which lies between the Passeio Publico, a park laid out along the bay during the colonial period, and the public square of Duque de Caxias, at the junction of the street-car lines to Laranjeiras and Botafogo. For this purpose the Federal Government bought the palace of Conde de São Clemente, which, on account of its marbles, paintings, and works of art, had always been regarded as the most magnificent private residence in the capital. A large park extends

[1] Op. cit.

from the rear of the palace to the bay. In addition to the buildings encircling the Praça de 15 Novembro the old part of the city contains many other notable structures. Near the wharf, in the spacious square containing the statue of General Osorio (Marquis de Herval), one of the heroes of the war with Paraguay, is the old Paço Palace (now occupied by the Department of Telegraphs, the Chamber of Deputies, and the Historical Institute), the Cathedral and Church of Santa Cruz, and not far away the Department of Industry, a magnificent building of modern construction. From this square starts the street of Primeiro de Março, containing the post-office and other modern buildings. It is the principal business street, filled with shops and warehouses. Near by is the custom-house and naval arsenal. Rua Ouvidor is an especially typical street. It contains the principal newspaper offices, bookstores, restaurants, confectionery shops, etc., and from early morning till late at night it is thronged with people and constitutes a veritable open-air club, where may be seen in the course of the day every man of prominence, whether in the field of politics, literature, or trade.

The mercantile and banking business of Rio de Janeiro is very large. On December 31, 1899, the cash balances of the five foreign banks in the city of Rio de Janeiro amounted to 42,631,000$000, as compared with 69,802,000$000 on December 31, 1898. The deposits were 87,934,523$459, against 92,704,098$082 on December 31, 1898.

Rio de Janeiro has a great attraction, not only for foreigners, but for the native population of the States, because of its business opportunities and greater comforts offered.

The tax on industries and trades in the Federal district for the single month of August, 1899, amounted to 1,085 *contos*. Brazilian, English, German, and French houses share with the Portuguese the wholesale trade. Exports consist principally of coffee; imports, of food products and manufactured articles. Cattle, imported from the River Plate or brought from the interior, are slaughtered at Santa Cruz, 60 kilometers from the capital. Rio de Janeiro has a number of cotton mills, foundries, furniture manufactories, and dry docks. Unfortunately, it is the most unhealthy city of Brazil. Yellow fever is endemic both here and at Santos, due to the poor sewerage and lack of hygienic measures. Tuberculosis and smallpox also make great ravages here, the latter being very common throughout Brazil, owing to the comparatively small number of vaccinations. During the summer, which is particularly hot and stifling in Rio because the hills which surround the city prevent the free circulation of the air, those who are able to do so seek Petropolis, Nova Friburgo, Therezopolis, and other elevated places in the vicinity. Here the scenery is enchanting and the climate admirable, yellow fever being unknown, as the microbe is unable to live above a certain altitude. Some of the islands in the harbor, especially the two largest, Governador and

Paquetá, offer a cool and delightful refuge to the inhabitants of Rio. The Hotel Paineiras, on the Corcovado Mountain, 710 meters above sea level, is also a cool and delightful retreat. A railway 4 kilometers in length leads to the top of this mountain, crossing three deep valleys before reaching the summit. At some points it has a grade of 30°. The water of the city is excellent, being furnished from springs which are protected by the forests surrounding Rio. The supply is also very abundant, being 200 liters for each inhabitant.

The system of public charity in Rio is no less satisfactory than that of public instruction, which is well established in the Federal capital. The insane asylum is an imposing building, and the hospital of Santa Casa da Misericordia, which treats annually 12,000 patients, would do honor to the greatest capital of the Old World. The Portuguese colony, which is large, wealthy, and philanthropic, has a number of educational and charitable institutions, two of which, the Hospital Sociedade de Beneficencia and the Lyceu Litterario, are models of their kind. This colony erected a library in commemoration of the three hundredth anniversary of the great Portuguese epic poet, Luiz de Camões, which is one of the finest buildings of Rio de Janeiro.

The 1899 receipts of the general revenue office at Rio de Janeiro amounted to 22,887,537$189 against 19,704,181$451 in 1898. The customs receipts amounted to 78,861,341$710 in 1899 and 86,774,458$000 in 1898. The total of the imports received at the Rio customs bureau in 1899 was 329,362,876 *milreis*, or, at the exchange of 12 *pence* per *milreis* (base adopted by the customs), about 287,702,600 *francs*.

CHAPTER VI.

THE STATES.

The State of Alagôas measures an area of 58,491 square kilometers, and has a population of about 648,009 inhabitants. Its boundaries are to the north and west the State of Pernambuco, Sergipe and Bahia to the south, and the Atlantic Ocean to the east. Its cultivated area is equal to and greater than that of much larger States, being greater than that of Piauhy and Parahyba and equal to that of Maranhão and Ceará. The density of its population is 0.9 inhabitants per square kilometer. The land is adapted to the cultivation of coffee, cotton, sugar cane, tobacco, rubber, vanilla, cacao, and the cereals. It has excellent grazing lands and vast forests of precious woods. Its lakes and rivers are well stocked with fish. Its exports in 1899 amounted to 11,600,000 *milreis*, and in the first six months of 1900 to 5,809,521 *milreis*, the principal exports being sugar, 17,556,493 kilograms; cotton seed, 3,821,857 kilograms, and raw cotton, 1,384,058 according to the latest available official data.[1] The import trade of the State through the ports of Maceiò and Penedo was in 1898 as follows: Maceiò 2,254,533 *milreis* and Penedo 434,180 *milreis*, and in 1899 Maceió, 2,507,996 *milreis* and Penedo 161,082 *milreis*.

The capital of the State is Maceió, situated between the ocean and one of the lakes which give the name to the State. The Mundahú River flows into this lake. Maceiò is a pleasant city, the streets of which are well shaded. Its commercial movement is centered in the port of Jaraguá, which is a part of the city. It has a population of 15,000. It exports sugar, cotton, rice, cajú wine, rubber, castor beans, etc. There is considerable navigation on the lakes. Fish are found in the lakes, salted fish constituting one of the exports. The State is politically divided into 13 comarcas or counties.

The two autonomous States, Amazonas and Pará, are geographically designated by the name of Amazonia. Amazonas, which is situated in the interior, was formerly a district of Pará, but in 1850 was converted into a province. According to Réclus,[2] the area of Amazonia is seven times that of France, while its population is very small, the total number of inhabitants, including civilized and savage, not exceeding 500,000.[3]

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[1] Boletim do Serviço de Estatística Commercial, No. 2, 1900.

[2] Op. cit.

[3] Census figures for 1890 for both States give 1,067,431 inhabitants.

This region is characterized by its wonderful river system, which is the finest in the world. Some idea of the splendid transportation facilities may be gained from the fact that, in spite of the extraordinary development which this part of Brazil has had in recent years, railways are almost unknown, there being only a small railway at Pará, and at first glance it would seem they could easily be dispensed with, for the network of rivers formed by the Amazon and its tributaries unites all parts of the Amazon region, and communication with the rest of Brazil is had by means of the ocean.

The Amazon is one of the longest rivers in the world and the largest in volume of water. After leaving the Andes and receiving a number of affluents, among others two of the principal rivers of Perú, the Amazon flows through Brazil, two-thirds of its course being in that territory. It receives no less than 400 tributaries from Brazil.

The greater part of the affluents on the right of the Amazon flow first due north, then in a northeasterly direction, while those on the left flow almost parallel with the equator. The great length of the Amazon is perhaps the cause of its changing its name three times. In Peru it is called *Marañon;* on the Upper Amazon, between Tabatinga and Rio Negro, it is called *Solimões*, and lastly the Amazon.

The width of the Amazon varies. At certain points it is more than 5 kilometers from bank to bank; for instance, at the point of confluence with the Madeira; at other places it is 2½ kilometers, as at Tabatinga; at Obidos or at the strait of Pauxis it is only 1,830 meters. Near the mouth, above the island of Marajó, the width is 11 leagues, and at the mouth 60 leagues. Its average depth varies from 75 to 100 meters, being as high as 550 meters in the Strait of Pauxis and 185 near the frontier of Peru and at the mouth. The volume of the Amazon is increased by the abundant equatorial rains, but the floods in its affluents do not occur at the same time. The northern affluents reach their highest level from April to September; the southern affluents rise in October, after the melting of the snows on the Andes. During the season of the floods this mighty river presents a majestic aspect. Beginning with the month of February, the melting of the snows on the Andes and the torrential rains cause the waters of the Amazon to rise 14 meters above the lowest level, and the current attains a velocity of 24 kilometers, which undermines the banks, detaching great pieces of land, which fall into the river, dragging trees and animals with them. The river, therefore, is full of débris of every kind and real floating gardens 2,000 square meters in area, which, dragged along by the flood, make navigation dangerous for small vessels.

One of the results of these inundations is the formation of lakes, islands, and canals, especially at the confluence of the large rivers. These lakes are called *aguas redondas.* The islands are surrounded by side arms of the river or by channels by means of which the affluents unite with the river. Between Tabatinga and the ocean there

are not less than 150 islands of all sizes. The arms of the river are called *igarapés* when they have no outlet, *paranás* when they unite the waters of the river, and *furos* when they unite two rivers. The Amazon empties into the Atlantic through an immense estuary, which is subdivided into numerous arms, such as the canal of Vieira Grande and the Pará River, which are separated by islands, the principal of which are Marajó, or Joannes, which was formerly a part of the mainland, Mexiana, Caviana, etc. The affluents are divided into rivers having clear waters and those having discolored or black waters. Among the former are the Rio Branco and the Amazon, which flow between banks formed of large deposits of pure white clay; the latter, of which Rio Negro is an example, flow between banks covered by immense forests of coniferous trees, and carry down great quantities of cedar and pine trees, which saturate the waters with resinous substances, imparting to them a dark color. There are still other rivers, as the Xingú, which have blue waters. The Amazon and its affluents are navigable for nearly 100,000 kilometers.

The boundaries of the State of Amazonas are British Guiana, Venezuela, and Colombia, to the north; Bolivia and the State of Matto Grosso, to the south; the State of Pará to the east, and Peru to the west. Its area measures 1,897,020 square kilometers, with a population of 207,610 inhabitants, or at the rate of 9.1 per square kilometer.

The climate of the Amazon region, although trying to the European on account of the constant heat, is in general excellent. It is temperate in the highlands, hot and humid in the lowlands. The temperature varies but slightly, ranging between 21° and 32° C. (70° and 89° F.). The uniformity of the dry and rainy seasons is especially noticeable on the Lower Amazon. The monsoon winds, which blow in an easterly to northeasterly direction, and the rains, which occur every afternoon, cool the air and render the nights more pleasant. Foreigners who have resided for years in this region unite in praising its healthy climate, which is very different from that of other tropical regions. The same latitude does not signify the same climate: Boston and Rome have different climates, as have also India and Amazonia. There are no desolating droughts in this region, as there are frequent rainfalls. Malaria is unknown on the banks of the Amazon, being found only, and that in the intermittent form, in the head waters and upper portions of its tributaries, in places which are not purified by the monsoon winds. It has been observed that rivers that have been healthful for years have suddenly become infected with fevers. These are due in great measure, however, according to Agassiz, to the customs of the inhabitants and to the want of hygienic precautions. Yellow fever has made its appearance in Belem and other cities, but it has always been imported from Rio de Janeiro and has always disappeared after the epidemic.

The Amazon region is characterized by a wonderfully fertile soil

and an abundance of natural products. The price of land is very low. A hectare of land for agricultural or breeding purposes situated at a distance of more than 2 kilometers from the banks of navigable rivers or railways sells for 8 *milreis;* when situated within 2 kilometers from navigable rivers and railways, 10 *milreis*, and 15 *milreis* per hectare for rubber lands.[1] The land in general is clayish and lends itself readily to the manufacture of bricks, tiles, and terra cottas. There are at the present several pottery works for the manufacture of china, representing a large capital, and a large number of sawmills which belong to the State. Both industries are prosperous, owing to the growth of the city of Belem, where in a single year more than 700 houses have been erected, there being in 1896, 8,355 houses within the city limits. "Along the banks of the rivers grow palms and plants of the species *acrocomia* and *astrocarium*, whose leaves contain fibers as fine and delicate as silk and stronger than linen or Egyptian hemp, which are used in the manufacture of nets, hats, mats, and baskets, furnishing, in addition to this, a fine white tow which can be used for calking purposes in the large shipyards and in the manufacture of paper. The Brazil-nut tree, the chestnut tree, and the *Cumarú* tree all furnish excellent oils. Other trees furnish splendid dyes. In the animal kingdom there are species which furnish oil for machinery and leather suitable for shoes and even for gloves, such as the alligator, otter, deer, etc. The soil contains minerals, marbles, coal, and a great profusion of unexplored riches."[2]

The Portuguese colony of the Amazon region is industrious and wealthy and has the larger part of the trade. Trade naturally suffers for want of consumers of manufactured articles, but it derives great importance from the quantity and value of the exports and imports of food products. The Amazon region has a splendid future, due to its unparalleled geographical position, communication facilities, and wonderful fertility.

Manáos, the capital of the State of Amazonas, population about 50,000 inhabitants, has grown and been greatly embellished within recent years, due to the fact that it is the capital of a State that is bound to have a great future development, and to its situation, as it is the center for commercial transactions of the Upper Amazon and its affluents. It is also favored by its geographical position, being situated at the confluence of the Rio Negro with the Amazon and near the point where the Madeira and Purús rivers join the latter. Manáos is lighted by electricity. It possesses a beautiful theater, parks, and buildings, and its population is more than half that of the entire State. In 1893 its population was 50,000, including Americans, engaged in the trades; Englishmen, who have a monopoly of the trade of the Purús River, and not a few Frenchmen, who are engaged in

[1] Lei de Terras do Estado do Pará, Belem, 1895.

[2] Ignacio B. de Moura, Industries, in the work L'Etat de Pará, Paris, 1897.

the rubber trade of Juruá. In the coming century Manáos will be the Chicago of this region, of which Belem is already the New York.

According to official statistics, in 1899 there were exported from that State 11,633,705 kilograms of rubber, valued at 114,576 *contos*. Other products exported were 2,025,281 kilograms cacao, 956,220 kilograms salt fish, 94,546 hectoliters of nuts, 120,660 kilograms of *piassava*, 175,757 kilograms of raw hides, 11,961 kilograms copaiba oil, 33,963 kilograms *guarana*, and 667 kilograms sarsaparilla.

The State is politically divided into six *comarcas* or counties.

The State of Bahia, with an area of 426,427 square kilometers and a population estimated at 1,683,141, is bounded on the north by the States of Sergipe, Alagôas, and Pernambuco; on the south by the States of Espirito-Santo and Minas Geraes; by the Atlantic on the east, and Piauhy and Goyaz on the west. Next to Minas Geraes it is the most populous State of the Union, and its capital, São Salvador, or Bahia, situated on the splendid bay of Todos os Santos, is one of the principal cities of Brazil, both in population and in the value of its trade. It has the largest negro population of any State in the Union, and up to the middle of the eighteenth century the capital of the colony was situated there. Its climate is salubrious, especially in the highlands of the interior. The soil is fertile and adapted to the cultivation of a variety of products. Its mineral wealth is also abundant.

Bahia has a number of navigable rivers, the principal being the Paraguassú, which empties into the bay. On this river is situated Cachoeira, an intermediate station for products brought from the interior, even from the distant States of Piauhy and Goyaz, separated from Bahia by mountain ranges. In Cachoeira and its suburb, São Felix, there are a number of cigar factories. These two cities are connected by a viaduct 368 meters in length. Manufacturing industries have made considerable progress in Bahia. It has a number of cotton factories, shirt factories, etc. A railroad from São Felix ascends the Paraguassú Valley as far as Lençóes, in an important diamond district. This railroad extends as far as the São Francisco River.

Another depot for products from the interior is Nazareth. It is situated at the mouth of the Jaguaripe River, south of the island of Itaparica. It is connected with the interior by rail, and large quantities of mandioca flour are sent from this point to the capital. The principal railway of the State runs north as far as Alagoinhas, where it divides into two branches. One follows the coast for a certain distance, traversing sugar and tobacco plantations as far as Timbó, near Itapicurú; the other extending in a northwesterly direction as far as Joazeiro.

Along the coast south of the Bay of Todos os Santos cities succeed one another at short intervals: Valença, which manufactures cotton goods, reputed the best in Brazil; Taperóa, hidden by a series of small islands; Camamú, a busy agricultural market near the port of

Acarahy, which, next to Bahia, is the largest, deepest, and best-protected port of these waters; Contas or Barra do rio das Contas, the river of which drains a rich diamond district; Ilhéos, or São Jorge dos Ilhéos, so called from the islands which protect its bay. Although Ilhéos is but a small town, its only trade consisting in the exportation of woods, it nevertheless has its history. Founded in 1830, it became important when the Jesuits made it the center of their missionary work in the Aymorés country. Gold mining in the neighboring mountains brought it considerable trade. The production of these mines, however, diminished, communication with the interior was shut off by the savage Indians, so that the once flourishing colony became a solitude and trade concentrated at other points along the coast.

It is now proposed to restore Ilhéos to its former prosperous condition by the introduction of colonists to engage in agriculture and trades, build roads through the forests, and utilize the water power for industrial purposes.

In the labyrinth of waters which unite the mouths of the Poxim, Pardo, and Jequitinhonha rivers, the town of Canavieiras prospers in spite of its marshy lands, there being exported from this port cacao, copal gum, piassava fiber, and jacarandá or ebony wood. South of this is the port of Belmonte, which communicates with the eastern districts of Minas Geraes by means of the Jequitinhonha River. In the upper part of the valley of this river is situated the famous city of Minas Novas. It was founded early in the eighteenth century by miners from São Paulo, on territory belonging to the Macussi Indians. The yellow topazes and aqua marines which are seen in the museums are found here.

A railway from the port of Caravellas, in the extreme southern part of the State of Bahia extends into the gold districts of the interior, passing through the city of Philadelphia, Theophilo Ottoni, which is the center of the agricultural settlements on the banks of the Mucury. This railway, which is projected as far as the port of Guaicuhy, at the junction of the São Francisco and das Velhas rivers, gives the preponderance of trade to Caravellas rather than to the other ports of southern Bahia. A number of vessels are engaged in whale fishing in the Archipelagos dos Abrolhos.

In the beginning of this century a small Chinese colony which had been engaged for the cultivation of tea at Rio de Janeiro was transferred to Caravellas, where it soon disappeared. To-day immigration flows toward this city, while Porto Seguro, where the history of Brazil began with the arrival of Pedro Alvares Cabral, is only frequented by fishing barks in search of *garoupa*.

The capital city, Bahia, or San Salvador, population about 200,000, with its enormous semicircle, offers one of the largest and best harbors of the world. The city occupies the extreme end of the promontory which protects the magnificent gulf on the east side.

The highest part of the city, which has an altitude of 40 or 50 meters, overlooks the harbor and surrounding ocean. The lower city is the business portion, while the upper city constitutes the residence part and contains many beautiful buildings and nearly 100 churches and chapels, mostly of the colonial period. The whiteness of the buildings contrasts strongly with the dark foliage. The two parts of the city are connected by elevators. Two breakwaters are projected, which will protect the harbor from storms and the surf. At the entrance of the harbor is the narrow island of Itaparica, known for its mild climate and the wonderful fertility of its soil. Towns and hamlets are scattered here and there about the entire semicircle, communicating with the capital by means of numerous steam ferries. The exports of Bahia consist of sugar, raw and manufactured, tobacco, coffee, cacao, cotton, cattle, hides, rubber, woods, gold, precious stones, etc. Whales are found along the coast and within the harbor, the oil of which is exported to Europe. The tobacco crop of Bahia from November, 1896, to October, 1897, amounted to 22,764,225 kilograms, valued at 22,419 *contos*. In 1899 the exports of tobacco amounted to 13,776,788 kilograms, valued at 17,262,790 *milreis*, and from January to June, 1900, to 17,048,196 kilograms, valued at 23,196,494 *milreis*. The exports of coffee during 1899 were 13,554,223 kilograms, valued at over 7,500,000 *milreis*, and in the first six months of 1900 amounted to 3,493,273 kilograms, valued at 2,457,691 *milreis*. The total export trade of the State in 1899 has been estimated officially at 47,093,606 *milreis* and from January to June, 1900, at 36,768,834 *milreis*.

The State is politically divided into 36 comarcas or counties.

The State of Ceará covers an area of 104,250 square kilometers, with a population of 881,686. The boundaries of the State are the Atlantic Ocean to the north and east, Parahyba and Pernambuco to the south, Rio Grande do Norte to the east, and Piauhy to the west.

The State of Ceará is one of the most thickly settled of the Union in relation to its territory, and its population would be even larger than it is if it were not for the droughts and the adventurous disposition of its inhabitants, which causes them to flock to the rubber lands of the Amazon region, where profits are greater and life easier than in the breeding lands of their own State. In 1892, 19,000 people emigrated from Ceará to the Amazon region. After the season for extracting rubber is over they generally return to their own State.

The Jaguaribe River, into which flow all the rivers that drain the State of Ceará, is navigable only in its lower course for a distance of 25 kilometers. This explains the relative growth of railways in Ceará as compared with the States of Maranhão and Pará. The Sobral Railway, which is owned by the Government, extends to the port of Camocim in the north. The principal port of the State is that of Fortaleza, which is at the same time the capital of the State. It is situated on a small bay protected by reefs. Vessels of small draft

are able to come alongside the wharf, while large vessels are obliged to discharge their cargo by means of rafts. Fortaleza is regarded as one of the most beautiful cities of Brazil. A railway connects it with Baturité, which is noted for its coffee, and is projected as far as Maranguape, where are situated extensive orange groves. This railway carries to the capital the trade of the Upper Jaguaribe, which is the most fertile and populous district of the State. The trade of the district of the Lower Jaguaribe passes through the port of Aracaty. A considerable part of the exports to Liverpool and New York, particularly goatskins, pass through the port of Mossoró, in the neighboring State of Rio Grande do Norte, which is approached by large merchant vessels. The principal exports of Ceará are cotton, cacao, coffee, sugar, hides and skins, wine of the cashew nut, wax, industrial products, etc. In addition to the railways there are many other important works in Ceará, such as artesian wells, cisterns, and dams, all of which testify to the interest the Federal Government has shown in this State.

Among the principal exports of the State of Ceará in 1899 were the following products, the values being expressed in *milreis:* Rubber (to Europe), 2,718,111; cattle (to the State of Pará), 1,052,201; cotton, 166,387 (69,618 to other Brazilian States and 96,769 to Europe); hides, 1,566,943 (758,187 to Europe and 808,756 to the United States); mules, 244,400; preserved fruits, 152,270, and hammocks, 504,176. The estimated value of all the exports of this State is 10,391,114 *milreis*, divided among the other States of the Republic and foreign countries as follows: Other States, 3,684,412; Europe, 3,791,844, and the United States, 2,914,858. On these shipments 955,960 *milreis*, equivalent to 9.2 per cent, were paid as export duties. From this State there were only 260 bags of coffee exported in 1899. During the first six months of 1900 the exports through Ceará have been officially estimated at 3,312,361 *milreis*.

The State is politically divided into 27 comarcas or counties.

The State of Espirito-Santo, 44,839 square kilometers in area and 382,137 population, lies between Bahia on the north, Minas Geraes on the west, the Atlantic Ocean on the east, and the State of Rio de Janeiro on the south. This State, noted for the rich woods found in its immense forests, has become in recent years one of the most progressive in Brazil, due to European immigration and the consequent development of its agricultural wealth.

São Matheus, in the northern part of the State of Espirito-Santo, is surrounded by coffee and mandioca plantations, the products of which are exported from this port, officially known as Conceição da Barra. There is another town at the mouth of the Doce River, but it has no commercial importance, as navigation at that point during the south winds is dangerous for vessels of more than 1½ meters draft. On the upper part of the river navigation is only possible to vessels of less

than one-half meter draft. Nevertheless, while the lower part of this river is without commercial importance, flowing through marshes and having an obstructed entrance, its upper part flows through one of the richest regions of Minas Geraes, in which is situated Ouro Preto, the former capital of this State. A railroad built by the West of Minas Company, now in operation for a long distance, is to put Ouro Preto in communication with the coast of Espirito-Santo. The lines of the projected railway system of the eastern part of the State are to converge in the town of Pessanha, on the northern affluent of Rio Doce. Cotton goods of a superior quality are here manufactured.

South of Rio Doce are situated a number of small ports, beyond which is the spacious bay of Espirito Santo, from which the State derives its name. It is here, in the extreme southwestern part of the island, that Victoria, the capital of the State, is situated. A wooden bridge spans the narrow channel which separates it from the mainland. On the mainland, facing the island, is the former capital, Villa Velha, with its imposing mass of churches and convents. To the east, overlooking the entrance to the bay, rise from the surrounding plain the isolated mountains Penha and Moreno. The former is 130 meters in height and is crowned by a church; the latter is 210 meters high and has a light-house upon its summit. To the north is Frade Leonardo Mountain and another still higher—that of Mestre Alvares—which lifts its three equal peaks to a height of 980 meters, supposed to be an extinct volcano, beds of sulphur being found there. On account of its size and proximity to the coast, this mountain is one of the most conspicuous landmarks of the entire Brazilian coast.

A few years ago the city of Victoria had almost no maritime trade, as its port was capable of receiving nothing larger than schooners. Improvements have been made in the harbor, however, which now permit the entrance of large trans-Atlantic steamers. The entrance to the harbor is from 5 to 6 meters deep.

The trade of this port is growing rapidly, and thousands of immigrants land here. Victoria has already over 20,000[1] inhabitants, and the State of Espirito Santo has become independent of Rio de Janeiro in its maritime trade. Colonies of Germans, Poles, Swedes, Tyrolese, Portuguese, and Italians, the latter numbering 30,000, are established in the southern part of the State, near Anchieta (formerly Benevente) and in the vicinity of Alfredo Chaves, Itapemirim, and Cachoeiro. Some of these colonies are still under Government protection, receiving annual subsidies in the form of seeds, cattle, etc., but the majority of the colonists are already independent of Government aid, owning their properties and working them on their own account. The principal agricultural product is coffee. The coffee exports in 1899, according to official statistics, amounted to 25,902,470 kilograms,

[1] The census of 1890 gave it 8,000 inhabitants only.

valued at 18,081,284 *milreis*, and during the first six months of 1900 they were estimated at 108,691 kilograms.

In 1899 the principal exports of the State were valued at 18,392,155 *milreis*, the items being coffee, as stated, tapioca, mandioca, cotton, cacao, hides and skins, woods, etc.

Public education has made great progress in the State.

The State of Goyaz, 747,311 square kilometers in extent and 260,395 population, is bounded on the north by the State of Maranhão; Piauhy, Bahia, and Minas Geraes on the east; São Paulo and Matto Grosso on the south, and on the west by Matto Grosso and Pará. This State enjoys a splendid climate, and has been selected for the site of the future capital of the Republic, the Constitution providing for its location on the plateau of Goyaz.

A special commission, at the head of which is the director of the observatory of Rio de Janeiro, has already marked the site for the new capital, which is a space 14,400 kilometers square on the Upper Tocantins, in the Pyreneus range of mountains. It has an elevation of from 200 to 300 meters above the level of the plateau and is drained by numerous streams of pure water, being the center of the confluence of the three hydrographic systems of Brazil. On either side are the towns Formosa and Pyrenopolis. The former, founded in the first half of the last century, is situated in the upper valley of Das Almas River, 740 meters above sea level. It is surrounded by a low, flat country, well adapted to the cultivation of cereals and the vine. The land about Pyrenopolis is but little cultivated outside of its gardens and orchards. The lowlands to the southeast of Pyrenopolis, however, are covered with rich pastures, hundreds of thousands of cattle grazing here every year. The gold and diamond washings, which formerly attracted to this region adventurers from São Paulo and Minas Geraes, now yield but small returns.

The Tocantins system is closely connected with that of the Amazon, the Tocantins running parallel with the southern affluents of this mighty river. Near its source is the watershed dividing this from the São Francisco and Paraná basins. It is here, near the point of divergence of her three great rivers, that Brazil wishes to establish the national capital. The State of Goyaz is elongated in form and is bounded on the west by the Araguaya River, which runs parallel with the Tocantins. These two rivers are about equal in extent and volume and unite to empty together into the Gulf of the Amazon. A large part of the basin of these two rivers, comprising 882,750 kilometers, is unexplored. The Tocantins is 2,500 kilometers long and the Araguaya 2,000 kilometers, and the Tocantins-Araguaya 2,800 kilometers. The depth and volume of the Tocantins would render navigation easy if it were not for its rapids and falls and the large rocks encountered in its bed. The head waters of the Araguaya are farther to the south than those of the Tocantins and not far from the source

of the Paraguay. At the mouth of its largest affluent, Rio das Mortes, is Bananal Island, having an area of 20,000 kilometers. The descent from the plateaus of the interior to the plains of the Amazon is made by falls and rapids. At the great fall there is a descent of 16 meters in the distance of 19 kilometers, which has been covered in one hour, while the ascent requires fifteen days for large vessels and from six to eight for smaller ones. The river formed by the union of the Araguaya and Tocantins takes the name of the latter. It has a number of falls and becomes very shallow as it nears the ocean, so that the total navigable distance of the Tocantins-Araguaya is only about one-tenth of its entire length, which comprises 17° of latitude. This river makes a descent of 800 or 1,200 meters from its point of departure in the Goyana range of mountains. Goyaz is deprived of all natural communication with the coast, and the State will have to employ artificial means, such as canals and railways, in order to make her two great rivers commercial highways. On the upper Tocantins-Araguaya there are great differences of temperature between the seasons, as well as between the days and nights, both torrid heat and biting cold being felt. Along the banks of the rivers are uninterrupted forests, while the elevated lands of the interior have only an occasional cluster of trees or *catingas*.

Goyaz is inhabited by a number of Indian tribes, the best known of which is the Cayapós tribe—a branch of the Gês family—which numbers about 12,000. They are strikingly Mongolian in type. The civilized population of Goyaz is very small. It unites on a much larger scale with the Indian than with the negro element. Large numbers of male negroes were formerly introduced into the State, but they have gradually disappeared with the abandonment of the mining industry, which has impoverished the State by withdrawing the population from agricultural pursuits. Immigration and railroad development will bring to the State a more stable prosperity in the future. Along the Tocantins are a number of villages or towns that are destined to be trade centers, such as São Felix, Porto Nacional, and Porto Affonso, the latter being splendidly situated at the confluence of the Tocantins and Somno rivers. The State of Goyaz is closed, so to speak, on the north to all save explorers. It is reached through the extreme southern part which borders on the Paraná basin.

The capital, Goyaz, formerly known by the name of Villa Boa, has a population of about 8,000. It is situated near the head waters of the Tocantins and Araguaya rivers. In the vicinity of the capital the vine is extensively cultivated, yielding two crops a year. The wine of Goyaz had once a great reputation, and its cut tobacco is of the finest quality.

The value of exports of the State, according to official figures for 1899, amounted to 205,159 *milreis*, the principal articles being: Tobacco, 102,891 kilograms; rubber, 42,622 kilograms; cattle, hides, and skins.

The State of Maranhão has an area of 459,884 square kilometers and a population of 459,040, or at the rate of 1 inhabitant per square kilometer. Its boundaries are the Atlantic on the north, Goyaz on the south, Piauhy on the east, and Pará on the west.

The coast zone between the Pará and São Francisco rivers comprises a number of river basins having about the same general slope, soil, climate, and products. The estuary in which is situated the island of São Luiz do Maranhão might be called a miniature of that of the Amazon, with its two large rivers and its group of islands lying between. Instead of the Amazon and the Tocantins, we have here the Grajahú and Itapicurú rivers, which do not compare with the former either in grandeur or volume of water. The same may be said of all the rivers of this region. Vessels of small draft ascend the Itapicurú as far as Caxias, which is distant 560 kilometers from its mouth.

The great variability in the volume of these rivers is due to the transitions from droughts, which reduce the streams to rivulets, to prolonged periods of rain. The *macaréo* or *pororóca* occurs in the estuary of the Grajahú River, as in that of the Amazon, although in the latter this flood is much stronger, reaching a height of 3 meters, and being heard at a distance from 8 to 10 kilometers. This constitutes a great obstacle to navigation, as it sometimes flows into the bays along the coast of Maranhão at the rate of 10 kilometers an hour, destroying the banks and inundating the land.

The Parnahyba River is 1,500 kilometers long and drains a basin 340,000 square kilometers in area. It separates the State of Maranhão from that of Piauhy and serves as a means of communication between the latter and the ocean.

Reefs from 30 to 60 meters in breadth extend along the entire coast from the Parnahyba to the São Francisco. Occasionally breaks occur, generally in front of the mouths of rivers. At low tide they are exposed to view. At Pernambuco they form the natural harbor of Recife.

The State of Maranhão was among those that felt most keenly the effects of the abolition of slavery. The agricultural and sugar industries declined. Foreign immigration ceased, thus paralyzing the energy for new undertakings, such as the exploitation of the mineral wealth of the State. The Governor of this State, in his message to the State Congress, of February 18, 1897, calls attention to the advantages to be derived from the employment of Indian labor and recommends the establishment of agricultural colonies and institutes where Indian children can be taught agricultural pursuits. Such an institute has been established at Barra do Corda, and the Indian colony at Alto Alegre is very prosperous. The Governor has entered into a contract for the establishment of a colony of German immigrants at Barreiras, in the municipality of Rosario, to be composed of 100 families.

Maranhão already shows an industrial development that is very

promising. Its principal agricultural products are sugar, coffee, cacáo, cotton, cattle, and leather. The exports of Maranhão during the year 1899, were estimated officially at 6,833,463 *milreis*, sugar, coffee, cotton, rice, rubber, tobacco, cattle, hides and skins, and castor beans being among the principal items of export. During the first quarter of the calendar year 1900 the exports by the ports of the State were estimated at 896,126 *milreis*.

The number of primary schools in the State in 1896 was 176. There were 6,409 students enrolled and an actual attendance of 4,908 students. In addition to these there is in the capital the Normal School and the *Lycéu Maranhense*, which is one of the best schools of the country.

Maranhão has been an important literary center. Gonçalves Dias, the greatest national poet, and João Francisco Lisboa, the best writer of the Brazilian language, are both from this State. São Luiz de Maranhão is the capital city, population about 38,000, Vianna and Caxias being the next in importance. The State is politically divided into 22 comarcas or counties.

The State of Matto Grosso covers an area of 1,379,651 square kilometers, with a population of 170,417 inhabitants. It is bounded on the north by Amazonas and Pará, on the east by Goyaz, on the south by São Paulo, Paraná, and Paraguay, and on the west by Bolivia. As may be seen, this vast State, which is large enough to accommodate 100,000,000 inhabitants, is situated in the very center of the South American continent, in the great watershed dividing the Amazon and La Plata systems, and, with the exception of a small zone in the southern part of the State, is almost depopulated. A large part of the State is unexplored. The first explorations made in the State were by adventurers from São Paulo at the close of the seventeenth century. The early settlers, who went there in search of gold, endured great hardships and privations. In order to reach the mines of Cuyabá, which is to-day the capital of the State, the *bandeirantes* or adventurous bands from São Paulo followed the course of the Tieté and Paraná rivers as far as the Pardo, ascending the latter and its tributary, the Anhambuhy, to the Santa Barbara Mountains and the plains of Vaccaria, and thence by the Miranda, Paraguay, and Cuyabá rivers to their destination. Others followed the direct route to Cuyabá, through the valley of the Das Mortes River.

To-day Matto Grosso is connected by telegraph with the rest of the Union, though not yet by railway directly. Communication is had by the Paraguay and La Plata rivers, thence by ocean.

The distance in a direct line from Rio de Janeiro to Cuyabá is 1,400 kilometers, and by way of Buenos Ayres 6,200 kilometers. The construction of a railway around the falls in the Madeira River is necessary to make the Guaporé, Madeira, and Amazonas route available. The direct route from Matto Grosso to Amazonas and Pará by the

Juruena and Tapajoz rivers is too difficult and tedious for trade, and is but little used save by explorers. A railway already extends over one-third of the distance between Cuyabá and the coast through São Paulo.

The land of Matto Grosso is not so high as that of the neighboring States. It is situated in a wide valley between the Andes on one side and the Brazilian plateaus on the other, and is drained by numerous rivers. The principal river is the Paraguay, which is among the rivers of the world of least slope, having at its head waters, 4,000 kilometers above sea level, a declivity of but 5 centimeters per kilometer. Vessels of small draft can ascend this river and its affluents, Jaurú, Sepotuba, Cuyabá, São Lourenço and Taquary, to the foot of the plateau in Brazil. Another remarkable phenomenon of the Paraguay is the mingling of its principal head waters with those of the affluents of the Amazon. An affluent of the Jaurú River is sufficiently near the Guaporé River to be connected with the latter by a canal. The Aguapehy, another tributary of this river, is separated from the Alegre by a narrow isthmus 5 kilometers wide. In the eighteenth century an attempt was made to open up a canal here, and owing to the abundant rains a large canoe of 12 oars succeeded in passing from the one river to the other. One of the governors of the State also endeavored to open up a canal 10 kilometers long in another part of the isthmus, but on account of the small amount of trade it was never completed. This would connect Montevideo and Pará by a continental waterway 8,300 kilometers long. In the near future it is probable that railways will take the place of the canal. There are many places on the edge of the plateau, farther to the east, where a simple cut of a few meters would connect the tributaries of the Amazon with those of the Paraguay transforming eastern Brazil into an island. There is a space of but 100 meters between the Estivado, a small tributary of the Tapajoz, and the Tombador, which empties into the Cuyabá.[1]

Communication with Goyaz seems assured by the navigability of the Garças and Upper Araguaya rivers, which was demonstrated by the recent exploring trips of Antonio Candido de Carvalho and Celso Pesini. During the floods the Paraguay River overflows its banks, forming a lake 600 kilometers long. The entire territory is strewn with lakes, some of which are fresh and others brackish. Fertile lands alternate with those that are sterile and sandy.

Matto Grosso, owing to its low ground, is perhaps the hottest part of Brazil although the cool winds from the pampas cause the temperature to fall below 0° Centigrade (32° F.) in the highlands bordering the enormous central depression which constitutes almost the entire State. The climate is not so regular nor so healthful as that of the Amazon region.

[1] E. Reclus, pp. 423–425, opus. cit.

It is estimated that there are still about 25,000 Indians, belonging to different tribes, scattered throughout Matto Grosso. The most savage is the Bororós tribe, which has recently been civilized. The Parexis Indians and the Guanés are employed in the gathering of ipecacuanha and other medicinal plants found in the splendid forests of the State. These tribes make baskets, nets, hammocks, etc., for sale. The Guaycurús constitute the largest tribe of Indians. These live in the southern part of the State and are excellent horsemen and skilled rowers. All of these tribes have mixed largely with the white population, which is derived principally from the State of São Paulo.

Matto Grosso, or Villa Bella, as it was formerly called, is in absolute decadence since the termination of the mining industry which gave it birth. The present capital of the State is Cuyabá, which has a population of over 8,000. This city also owed its origin to a mining venture, but as it possesses a more healthful climate it has prospered. São Luiz de Caceres is the center of a stock-raising district. In the vicinity are large beds of iron. Corumbá, with a population of 7,000, on the Paraguay River, contains the important arsenal of Ladario and has the largest trade of any city in the State.

The principal exports of Matto Grosso in 1899 have been officially estimated as follows: Maté, 4,692,696 kilograms; cattle, 4,072 head; beef, extract of beef, bones, hair, etc., 11,954 kilograms; hides and skins, 7,888 kilograms; rubber, 59,136 kilograms; other products, 1,448 kilograms.

Minas Geraes, which originally owed its name to its mining wealth, measures 574,855 square kilometers in extent, and with a population of 3,009,023 is the most populous as well as one of the most important States of Brazil. It is bounded on the north by Bahia, on the west by Goyaz, by São Paulo and Rio de Janeiro on the south, and Espirito Santo and Bahia on the east. The southern part of the State communicates with the coast to the southeast by the railroads that cross the coast range of mountains and center at Rio de Janeiro. The outlet for the vast, rich region of the northern part of the State, however, is more difficult, being by way of the rivers that descend from the plateaus to the coast, emptying into the ocean at different points between Espirito Santo and Alagôas. The natural port for the greater part of the State is Victoria, capital of the State of Espirito Santo.

The State of Minas Geraes is essentially mountainous. Even its so-called plains are broken by hills which rise to a height of from 100 to 200 meters above the plateaus, the average height of which is 1,000 meters. From this central point of Brazil diverge several mountain chains or ranges, the principal being that of Espinhaço, although the highest mountain of Brazil belongs to the Mantiqueira range, running parallel to the coast of Rio de Janeiro. Caraça Peak, which is the highest of the Espinhaço range, is 1,955 meters in height. The city of Ouro Preto is situated at the base of Itacolomi Mountain. The

northern part of the State is no less broken than the southern part, being composed of plateaus and mountains. In the northeastern part of the State, near Bahia, the mountain range merges into broad plateaus. To the east lies the Serra dos Aymorés, which runs parallel with Espirito Santo. From the mountains of Minas Geraes springs the São Francisco River, its volume being increased by the waters of its main tributaries, the Paraopeba and Rio das Velhas. The São Francisco River is 9,220 kilometers in length. Its basin covers an area of 668,500 square kilometers, having 7,000 kilometers of river navigation. The river itself is navigable for a distance of 1,310 kilometers above and 225 kilometers below the falls of Paulo Affonso, which are encompassed by a Government railway.

The Jequitinhonha River, which empties into the São Francisco near the city of Belmonte, in Bahia, also rises in Minas Geraes, and at the boundary of the two States makes a fall of 15 meters, known as Salto Grande. Including the Pardo River, it has a length of 810 kilometers. The Doce River, which is 700 kilometers long, rises in the eastern section of the gold-mining region, in the Espinhaço Mountains.

Notwithstanding the most important portion of Minas Geraes is in the valley of the São Francisco River, its principal cities are situated in the basins of other rivers. Barbacena, São João d'El Rei, and Tiradentes are situated in the Paraná Basin; Juiz de Fora on an affluent of the Parahyba; Ouro Preto and Marianna in the upper valleys of the Jequitinhonha. The largest cities are in the southeastern part of the State, their growth being stimulated by their proximity to Rio de Janeiro. Quiloz, the town nearest this center, is situated near the source of the Paraopéba, and is noted for the excellence of its cotton mills.

Ouro Preto, or Villa Rica, as it was called in colonial times, is no longer the capital of the State. The new capital was recently established at Bello Horizonte, a town especially built for this purpose on a plateau 13 kilometers west of Sabará. It has many fine public buildings and official residences, with public lighting and water service. In the vicinity are springs of pure water sufficient to supply a population of 450,000. Ouro Preto, with a population of about 20,000, is picturesquely situated and rich in historical traditions. East of Ouro Preto, at the base of Itacolomi Mountain, is Marianna, a city of churches and seminaries.

There are many cities in this part of the State which formerly were very prosperous but are now in a state of decline. At the present time the wealth of Minas Geraes is derived from agricultural, manufacturing, and stock-raising industries, rather than from gold and diamond mining. These industries not only give life to undeveloped districts, but renewed prosperity to gold mining, which is entering upon a phase of extraordinary activity. The manufacturing indus-

tries of the State are well developed, especially the cotton factories, which are equipped with the most improved machinery from the United States and Europe.

The State contains a large number of mineral springs, though the waters of but few of them have as yet been analyzed. Those best known are Caxambú, Lambary, Cambuquira, Caldas, Contendas, and S. Lourenço. These are supervised by the State and are yearly visited by large numbers of people. The principal cities of the upper São Francisco, like those of the southeastern part of the State, gravitate in the direction of Rio de Janeiro instead of toward Bahia, their natural point of convergence. This is due to the trend of the railways and the consequent better facilities of communication, although no railway yet properly crosses this district. These cities are Diamantina, a town of about 14,000 inhabitants, and Grão Mogol, in the upper valley of the Jequitinhonha, north of the Espinhaço range; Sabará, a mining town, situated 695 meters above sea level; Santa Luzia, and Parauna, the geometrical center of the State. In the extreme northern part of the State are Montes Claros, near the source of the Verde River; Paracatú, situated on an affluent of the Paracatú River near the boundary of Goyaz. From this port sugar and brandy are exported in large quantities. Along the river below the falls are a number of small towns.

In the Assuruá range, to the east of Barra, are a number of rich gold mines. Farther down, on the left bank of the river, is Pilão Arcado, which has an extensive trade in salt, found in the argillaceous banks of the São Francisco. Its large beds of rock salt have not yet been mined.

Most of the railways of Minas Geraes are in the southern and southeastern parts of the State. Their number is quite large.

Minas Geraes has an excellent climate. The land is elevated, fertile, and swept by cool breezes, and, the State being essentially peaceful and progressive, it would be surprising if it should fail to attract a large number of immigrants. The number of immigrants that entered the State of Minas in 1896 was 22,496. These were Italian, Spanish, Portuguese, German, Swiss, and Austrian. In 1895 only 6,631 immigrants entered the State.

The State of Pará, 1,149,712 square kilometers in extent and a population of 859,821, is bounded on the north by the Atlantic Ocean and the French and Dutch Guianas, on the south by Matto-Grosso, on the east by Maranhão and Goyaz, and on the west by the State of Amazonas, with which it forms the region of Amazonia, already described on page 66, a repetition of the main physical features of the territory being unnecessary. The State is politically divided into 43 municipalties.

At the close of the last century the total trade of Pará did not exceed 300 *contos*. In 1836–37 the national and foreign imports

amounted to 1,820,102 *milreis* and the exports in the following year (1837–38) amounted to 821,622 *milreis*. The following table shows the growth of trade from that time to 1894:

Year.	Imports.	Exports.
	Milreis.	*Milreis.*
1850–51	2,991,953	1,986,542
1861	5,660,147	5,567,058
1871	11,796,407	9,348,295
1881	16,907,911	15,701,072
1891	21,235,737	27,755,667
1894	34,740,501	40,780,319

In 1836–37 the navigation movement was only 100 vessels, of 13,843 tons, and in 1850–51, 84 vessels, of 14,701 tons. In 1861 it rose to 116 vessels, of 72,406 tons; in 1871 to 260 vessels, of 140,472 tons; in 1881, 311 vessels, of 225,484 tons; in 1891, 410 vessels, of 472,357 tons, and lastly, in 1894, to 443 vessels, of 493,400 tons.

"A comparison of these figures," says an authority,[1] "shows that the foreign trade has increased during the last twenty years 296 per cent, or an average yearly increase of 14.8 per cent, which is remarkable, and only to be compared with the rate of increase in the United States. In France the rate of increase does not exceed 10.2 per cent. It is also necessary to note the constant excess of exports over imports, an excess which in 1894 amounted to 6,039,818 *milreis*. According to Government reports, the total value of the products of the State during this year greatly exceeded 56,000 *contos*. This represents 93 *milreis* per capita, estimating the population of Pará at 600,000 inhabitants."

The principal products of Pará and Amazonas are rubber, cacao, nuts, tobacco, mandioca flour, and hides and skins.

Rubber represents nearly two-thirds of the total value of the products of Pará, and constitutes 25 per cent of the total revenue of the State and 90 per cent of its exports. The following table gives the exports of rubber from the State of Pará from 1865 to 1894:

Years.	Kilograms.	Value.
		Milreis.
1865–1869	16,364,646	22,356,382
1869–1874	18,764,268	33,557,107
1874–1879	25,655,972.5	33,002,390
1879–1884	26,785,215.5	66,339,301
1884–1889	35,231,918	71,592,922
1889–1894	34,762,238.5	114,891,338

A Belgian consular report[2] furnishes the following data:

The exports of rubber during the crop (July, 1896, to June, 1897) amounted to 22,216 tons, as follows: United States 9,848 and Europe

[1] Pedro da Cunha, Revenus Publics et Commerce, in the work L'État de Pará, Paris, 1897.

[2] Recueil Consulaire, Tome I, 1898, p. 332.

12,368. Of this amount, Manáos exported to Europe 4,043 tons and to the United States 2,634 tons, while Pará's exportations were 7,719 and 7,214 tons, respectively.

The same authority also gives the following figures in regard to the exports of cacao from Pará and Amazon as during the season 1895–96: 4,002,333 kilograms—divided between Pará, 3,195,222, and Amazonas 807,111—valued at 2,797 *contos de reis;* chestnuts, during the same period, 139,922 hectoliters, and hides and skins, 686,514 kilograms, valued at 217 *contos de reis.*

Very little of the tobacco raised in the States is exported. In 1894 the quantity of this product entered for consumption in the market of Belem amounted to 405,320 kilograms, valued at 992,787 *milreis.* Pará produces annually over 20,000,000 kilograms of mandioca flour, the price ranging from 3 to 8 *milreis* per bushel (28 liters), having reached as high as 18 *milreis.*

The oldest bank in the State of Pará is the Banco Commercial do Pará, founded in 1869 with a capital of 1,000 *contos* which was increased in 1883. The Banco do Pará, founded in 1883, has a capital at the present time of 3,000 *contos.* It performs discount operations; opens current accounts on a guaranty of commercial values; makes loans on mortgages of city real estate; buys and sells securities of companies and associations; collects bills and checks and gives letters of credit abroad and at home. G. Amsinck & Co., of New York, is a branch of this house. Other banks are the Banco de Belem do Pará, founded in 1886 with a capital of 2,000 *contos;* the Banco Norte do Brazil, with a capital of 3,000 *contos,* which has the privilege of issuing notes; the Banco de Credito Popular, with a capital of 2,000 *contos,* and the branch houses of the London and Brazilian Bank of London and of the London and River Plate Bank, also of London, and of the British Bank of South America. The principal companies of Pará are the Companhia Auxiliar do Commercio which owns large warehouses in the port of Belem; the Companhia de Construcções Paraense (the Pará Building Company), which owns over fifty houses already built, and as many more in process of erection, and enjoys a subsidy from the Government; the Companhia Urbana de Via Ferrea Paraense, which owns all the street railways of the city; the Companhia Protectora da Industria Pastoril, which supplies the capital with meat, and the Companhia Frigorifica Pastoril Brazileira, which has charge of the preserving of the meats. This company has a capital of 60,000 *contos* and is the owner of seven vessels.

Belem, capital of Pará, is already a commercial center and is destined to be a great South American emporium, because of its proximity to North America and Europe and the river system of the Amazon region which enables it to receive and dispatch merchandise to other States of the Union, such as Maranhão and Goyaz, and to the neighboring Republics, such as Peru, Bolivia, and Venezuela. Belem or Pará was

founded in 1615, but it is only recently that it has assumed commercial importance. At the time of the independence of Brazil it had only 25,000 inhabitants, which number decreased to 15,000 in 1848, after the so-called war of the Cabanagem, a social war in which Indians and negroes were arrayed against the whites, Brazilians against the Portuguese, the slaves against their masters, the poor against the rich, and Catholics against Masons. The appearance of yellow fever in 1850 caused Belem to fall into still further decadence, but notwithstanding so much adversity its growth has been wonderful. In less than half a century its population increased sixfold (in 1896 it was 90,122) and its trade tenfold. Belem is situated on a plain, and like all the other cities situated on the Amazon and its tributaries it is almost surrounded by water. It is situated at the mouth of the Capim, a tributary of the estuary of the Pará or Tocantins, 100 kilometers from the Atlantic. It has a harbor 7 meters in depth. Rivers and natural canals intersect this entire region, converting it into a magnificent tropical Holland. The capital of Pará contains some splendid buildings—churches, public buildings, schools, etc.—in addition to handsome residences. The other cities of the State of over 10,000 inhabitants are Cametá, Breves, Bragança, Santarem, Abaeté, São Domingos da Boa Vista, and Vigia.

It is not natural wealth that is wanting in the Amazon region, but population. This is the cause of the slow growth of the cities, such as that of Tabatinga, for example, which is situated on the frontier of Peru. This city was founded in 1776 and is an important point for trade and passenger traffic. The white population is especially small in this equatorial region, there being very few foreigners. The proportion of Europeans, compared with Indians, negroes, and the mixed population, is 78 per cent in Santa Catharina, 67 per cent in São Paulo; in Paraná, 55 per cent; Rio Grande do Sul, 50 per cent; Alagôas, 25 per cent; Bahia, 24 per cent; Piauhy, 21 per cent, and Amazonas, 19 per cent. Eighty-one per cent of the population of Amazonas consists of a few negroes and Indians of many different tribes. The alternating Indian and Portuguese names of the localities in this region indicate plainly the predominating colonizing element.

The following is a summary of the export trade of Belem, State of Pará, during the year 1898, taken from official reports:

Rubber.—To New York, 7,474,324 kilograms; to Liverpool, 6,430,882 kilograms; to Havre, 527,123 kilograms; to other ports, 59,895 kilograms; total, 14,492,224 kilograms.

Cacao.—To Havre, 853,688 kilograms; to New York, 63,233 kilograms; to Liverpool, 42,830 kilograms; to other ports, 114,832 kilograms; total, 1,074,583 kilograms.

Chestnuts.—To New York, 52,401 kilograms; to Liverpool, 41,144 kilograms; total, 93,545 kilograms.

The official value of these products was as follows: Rubber,

126,103,397 *milreis;* cacao, 2,383,913 *milreis;* chestnuts, 2,032,686 *milreis;* total, 130,519,998 *milreis.*

The official value of other products exported from Pará, such as cumarú, guarana, ox and deer hides, glue, copaiba oil, piassava, and cinchona, was as follows:

To New York, 336,729 *milreis;* to Liverpool, 484,568 *milreis;* to Havre, 506,356 *milreis;* total, 1,327,655 *milreis.*

Thus it will be seen that the total value of the exports from Pará during 1898 amounted to 131,847,653 *milreis.* Comparing this sum with the value of the exports during the last five years, it will be seen that there has been a constant increase, and that the valuation has almost doubled in that time.

While the export trade of Pará is extraordinarily large, the importation of alimentary products of prime necessity is no less remarkable. In 1898 Pará imported 26,961,473 kilograms of mandioca flour and 3,337,265 kilograms of maize, both of which products grow to perfection in this State.

The State is making every effort to increase production, establishing agricultural centers throughout the Commonwealth. The small farmers are engaged in the cultivation of mandioca, corn, and tobacco, a very high price being paid in the State for the latter. Rice is also cultivated extensively, there having been a decrease in the imports of this product in 1898 amounting to 157,071 kilograms.

The exports of Pará for the first three months of the calendar year 1900 amounted to 64,158,029 *milreis,* according to official statistics.

The State of Parahyba measures an area of 74,731 square kilometers, with a population of 382,587, its boundaries being Rio Grande do Norte to the north, Pernambuco to the south, Ceará to the west, and to the east the Atlantic Ocean. This State, as well as Rio Grande do Sul, is traversed by the Piranhas River, at whose mouth is situated the port of Macao, through which are exported large quantities of salt. The principal port of the State is Parahyba, capital of the State, on the estuary of the Parahyba River. The principal exports of the State are cotton, leather, mangabeira rubber, cheese, castor-oil beans, woods, and sugar. The climate is excellent. The State of Parahyba was formerly absolutely dependent for its trade on the port of Recife. To-day it trades directly. The Conde d'Eu Railway runs north from the city of Parahyba through the Mamanguapé Valley and southward to a point not very far from the survey for the railway to extend from Recife to the northern part of the State of Pernambuco. The city of Parahyba is situated 30 kilometers from its port, which is called Cabedélo, and is famous in the history of Brazil for the strong resistance it made in the early period of its colonization. Its fort was the theater of heroic struggles, as was this whole region, which was occupied by the Dutch in the seventeenth century. Unlike Recife and Olinda, the present and former capitals of the neighboring State of Per-

nambuco, the new and old portions of the city of Parahyba are united. The new part of the city comprises the wharves and business houses, while the old part is built upon a bluff from which stand out conspicuously the old abandoned convents. Customs receipts during the calendar year 1899 amounted to 832,665 *milreis*.

The State of Paraná has 221,319 square kilometers and a population of 626,722. It is bounded on the north by São Paulo; by Santa Catharina and the Argentine Republic on the south; the Atlantic on the east, and Matto Grosso and Paraguay on the west. Paraná was formerly a part of the State of São Paulo, but during the Empire was transformed into a province, now a State. The climate is healthful and the soil extremely fertile. The principal river is the Paraná River, which separates the State from those of São Paulo, Matto Grosso, and the Republic of Paraguay. The rivers of the Paraná system are much more important than those of the valley of the Serra do Mar. Of the latter the Ribeira de Iguapé is the largest between the States of Rio de Janeiro and Rio Grande do Sul. The Tieté, Mogyguassú, and other rivers are tributaries of the former system, or of the great Paraná River, which joins the Paraguay to flow together into the basin of the Plata. The Paraná receives the greatest number of its affluents from the Atlantic side and flows through an extent of territory considerably greater than that of the Paraguay. In this respect the Paraná corresponds to the Missouri, in North America, and the Paraguay to the Mississippi. Réclus refers to a navigable waterway between the States of the coast and Matto Grosso, stating that vessels descend the Paranapanema River, which is navigable below the Tibagy River, to the Paraná, and down this river as far as the Ivinheima, which they ascend to a point near Miranda, of the Paraguay system. The total distance navigable is 707 kilometers.

The navigation of the Paraná is greatly obstructed by rapids and falls, the principal of which are the famous Sete Quedas, or Quedas de Laguayra, consisting, as the name indicates, of a number of falls ranging from 15 to 18 meters in height. The Iguazú, a large affluent of the Paraná River, also empties into the latter by a fall called Salto de Victoria, which, like the Sete Quedas, presents a vast semicircle of cascades. Its largest fall is 60 meters high. At this point Brazil established a military post, now grown to be a promising city, for the purpose of controlling the navigation of the lower Paraná as far as Argentine waters. Below the Iguazú the Paraná, free from falls and rapids, flows through defiles like that of Itauguaymi, where the stream, which in some places is from 4 to 5 kilometers in width, narrows down to less than 140 meters. Below this point, leaving its course parallel to the coast, it turns abruptly to the west, flowing past low islands and between marshy banks. The interior of São Paulo, Paraná, and Santa Catharina—that is, the eastern part of the Paraná basin—is

characterized by low, grassy plains similar to the pampas of the Argentine. The trees of this region are not so high as those of the coast zone, and lose their leaves during the dry season.

Curitibá, the capital of Paraná, bears the same relation to the port of Paranaguá as São Paulo does to Santos. It has a population of 6,000, half of which are Europeans. It is situated on a plateau 889 meters above sea level. It is connected with the ocean by a wagon road, and since 1885 by a railway. The latter encircles the magnificent Morumby Mountain and descends by a series of cuts, tunnels, and viaducts. In making the descent the view is more extensive and beautiful than that had from the inclined plane of Santos. The lofty mountains, with their striking outlines, the wide, open valley, the vast plain, and the picturesque gulf impart an aspect of magnificence and grandeur to the landscape. The grade of this road is steeper than that of the railroad at Santos, though the engines are able to draw trains of 8 coaches at a speed of 20 kilometers per hour. The highest point of the road is at the entrance of a tunnel, 956 meters above sea level. The port of Antonina, on the same gulf, is not so deep as that of Paranaguá, but is sufficient for vessels having a draft of from 4 to 5 meters. It is especially useful in time of floods, when inundations threaten to cut the principal road to the other port. The State pays a subsidy to the line of steamers running directly between Paranaguá and Hamburg. From these two ports of Paraná are exported woods, maté, sugar, and cereals.

The maté industry is the leading one of the State. There is a yearly increase in the consumption of this product in the southern part of Brazil, the Argentine, Uruguay, and Chile. The yearly exports of this product from Paraná amount to 20,000,000 kilos, worth 6,000 *contos*. Another valuable product of the State is the *Araucaria* wood, which is an excellent substitute for pine, being much harder.

The State west of Curitibá is settled principally by foreign colonists, mostly Germans and Poles. According to the report of the Director of the Department of Public Works and Colonization for 1896, the total immigration into the State between the years 1890 and 1896 was 34,378.

There is one railway in the State, which extends to the frontier of the neighboring State of Santa Catharina by way of Lapa. This railway, which is a wonderful work of engineering skill, crosses the Iguazú River, on the right bank of which are situated the Polish colonies above referred to. The Polish population in 1892 was estimated by E. Réclus to be 100,000—that is, a little less than one-third of the total population of the State, which is among the most sparsely settled of Brazil. The soil of the State is very fertile and the climate healthful. Gold, mercury, and other minerals abound.

By reason of the growing colonization the State is destined to have a much more brilliant future than that contemplated by the Jesuits,

whose missions are found in ruins through the interior, where to-day the land is being restored to agriculture. This change is marked by the rising city of Guarapúava, which is situated at an elevation of 1,200 meters in a mountainous region in the Iguazú Valley and not far from the head waters of the Ivahy.

The number of primary schools in 1896 was 249. In addition to these, there are many private institutions under the direction of foreign teachers, principally Germans. The Gymnasio Paranaense is an institution of secondary instruction. The State Government pays an annual subsidy to a number of educational institutions, two of which are showing excellent results—the Conservatory of Fine Arts and the School of Arts and Trades, of Paraná.

In 1899 the customs receipts of Paranagua were estimated at 2,655,155 *milreis*. The exports of the State during the first six months of 1900 have been officially valued at 1,251,802 *milreis*.

The State of Pernambuco has an area of 128,395 square kilometers, with a population of 1,101,539. Its boundaries are Parahyba and Ceará on the north; Alagôas on the south; Piauhy and Bahia on the west, and the Atlantic on the east. Pernambuco is one of the leading States of the Brazilian Union, on account of its population, excellent soil and climate, historical traditions, and intellectual advancement.

The State of Pernambuco does not correspond exactly to the territory originally donated in the sixteenth century to Duarte Coelho. The district of Alagôas was converted into another province in 1817, and in the north a small part of the mainland and the island of Itamaracá, together with a large part of the present State of Parahyba, formed the province of Itamaracá, which later reverted to the Crown. The captaincy or province of Rio Grande do Norte was never colonized by its concessionaire. It was explored by an expedition from Pernambuco, to which State is due the exploration of almost the whole of northern Brazil and its defense against the invasions of the French and Dutch.

Pernambuco has passed through a crisis due to overproduction and consequent low prices of its two leading products—sugar and cotton. In the interior cattle raising is the leading industry. Cereals are cultivated to some extent. Coffee is grown in the coast zone. The abolition of slavery served to hasten the decline of agriculture in Pernambuco. The State has endeavored to aid this industry by issuing bonds guaranteed by mortgages on rural property, thus enabling the old-fashioned sugar mill run by water, horse, or steam power to be transformed into a modern establishment. During the administration of Governor Barbosa Lima, who endeavored to encourage the agricultural industry of the State by loans and by establishing rewards or premiums for the cultivators of coffee and cacáo, contracts were entered into for the establishment of about thirty mills, which were subsidized by the State.

Most of these mills are in operation. The large bond issue resulted in lowering their quotation and preventing the proprietors from realizing large profits.

Were it not for the fluctuation in price of its principal agricultural product, Pernambuco would be in an enviable position, as it has all the conditions of prosperity. The present harbor of Recife does not admit large vessels, as its channel is very shallow, having a depth of about 6 meters at high tide, while at low tide only vessels of 4.40 meters draft can enter. For ordinary freight vessels, however, the harbor is of easy access and well protected and the unloading can be effected promptly. The Government of Brazil called for proposals in the United States and Europe for works of improvement in the port of Recife, in accordance with the general plan adopted. When these have been completed the harbor of Recife will become the natural intermediate port of three parts of the world—Europe, Africa, and the eastern coast of America.

It is evident that in the near future, when communication facilities enable trade to take the shortest course, Pernambuco, the most eastern point of the Republic and of the new world of Latin-America, will become the most frequented port of all South America.[1] Just as Belem, by means of the Amazon, must draw the trade of the northern transandine republics, so Pernambuco, when Recife and Rio are connected by a railway running along the coast or through the São Francisco Valley and when the transcontinental railway to Valparaiso is completed, will summon to it the trade of Chile and of the opulent Brazilian *hinterland*. Nearly all the trade of Recife is confined to the State at the present time. Twelve navigation companies touch at this port.

With the exception of São Paulo and Minas Geraes, there is no other State of the Union so well equipped with railways. Three great railway lines radiate from Recife, in addition to steam tramways for the suburban service and other smaller railways. The first belongs to an English company, and follows the course of the Capiharibe River as far as Limoeiro, the center of the sugar industry. A branch of this road extends from Pau d'Alho to Nazareth, the second largest city of the State. The second belongs to the Federal Government, and extends in a westerly direction to the valley of Ipojuca, passing through Jaboatão, Victoria, Gravatá, Bezerros, and extending as far as Caruarú, the most prosperous city of the interior, and noted for its healthy climate. The third railway belongs to an English company as far as Palmares, the rest of the line belonging to the Federal Government. It extends in a southwesterly direction, passing through the principal agricultural zone of the State. A branch of this road runs south, connecting with the Norte das Alagôas Railway. The

[1] E. Reclús, p. 245.

main line extends beyond Garanhuns, a town situated 845 meters above sea level and destined to become the great sanatorium of the State.

This line is to be continued through the São Francisco Valley to a point on the São Francisco above the Falls of Paulo Affonso. Joazeiro, situated on the frontier of Pernambuco and Bahia, will be the terminus of the great railway which starts from the capital of Bahia and runs in a northwesterly direction across this rich State. A railway is in course of survey which is to extend from Recife northward, through Iguarassú and Goyana, as far as Itambé, on the frontier of Parahyba. The Federal Government has entered into a contract for a railway which is to connect Palmares, on the southern line, with the port of Tamandaré, where one of the three large quarantine stations along the Brazilian coast is to be established. The Santos Dias Railway is to connect Frecheiras, on the southern line, with the town of São José do Amaragy. The railroad from Ribeirão to Bonito receives a subsidy from the State, as well as the Usina Cachoeira Lisa Railway.

The street-car lines of the city extend to Dois Irmãos, Varzea, and Olinda. One line runs from Boa Viagem to the bathing beach and another is being built from Afogados to Tigipió.

The Dutch burned Olinda, the former capital of the province, and made the port of Recife the capital, thereby adding to its importance. Olinda is situated on an eminence at a distance of about 7 kilometers from Recife, to which it is joined by a narrow strip of land. The situation of Olinda is unsurpassed, and sooner or later it will return to what it was formerly—a city of delightful residence. Recife has been called the Venice of America, though somewhat inappropriately, for it has no canals. It is divided by rivers into three districts or sections. The first, called Recife, is the commercial district, and consists of a small peninsula, formed by the isthmus which joins Recife to Olinda; the second, Santo Antonio, is an island, and contains the Government buildings; the third district, Boa Vista, is on the mainland, and consists principally of private residences. Recife has a number of fine churches and public buildings. The Egreja da Penha, which was built by Italian Capuchin monks, is one of the finest of the modern churches of Brazil. Among charitable institutions are the insane asylum of Tamarineira, which accommodates 400; the poorhouse, hospitals for contagious diseases, and the orphan asylum. These establishments, together with the Pedro II Hospital, are under the direction of that most worthy institution, Santa Casa de Misericordia, which has a large endowment fund.

After Rio de Janeiro, Pernambuco may be considered the most important intellectual center of Brazil. This is largely due to the law school, established in 1831, which has attracted to this State a large number of distinguished professors and young men of talent.

The Benjamin Constant High School, formerly the Gymnasio Pernambucano, has come to be the best of its kind in the country, second to the Pedro II College. It employs a number of professors and teachers and has a large number of students. There is a commercial night school in connection with this college. There are 191 primary schools in the State, of which 80 are for the masculine sex, 69 for the feminine, and 42 for both sexes. There are 59 municipal districts. Barbosa Lima, when governor of the State, founded an industrial school called Frei Caneca, for which he engaged Belgian and German teachers. The object of this school is to give practical instruction in agriculture and the trades and maintain an agricultural station where experiments may be made.

The national penitentiary was formerly situated on the island of Fernando de Noronha, but as the island has been turned over to the State of Pernambuco, the criminals who were confined there have been distributed among the respective States. The government of Pernambuco has entered into a contract for the establishment of a coal deposit on this island and for working the deposits of phosphate of lime on the neighboring islands. The coal contract has already been carried out, there having been exported from the island large amounts of coal. The island has an excellent climate and a good soil.

The population of Recife and its suburbs is about 120,000 inhabitants. Nazareth has 15,000, Goyana and Victoria, 10,000.

The receipts for 1895–96 were estimated at 8,388,647 *milreis* and amounted to 9,367,852 *milreis*. The expenditures were estimated at 8,588,647 *milreis* and amounted to 10,019,193 *milreis*.

The principal products of the State are cotton, sugar and cane products, coffee, and cereals. The exports in 1899 were valued at 22,581,975 *milreis*.

The State of Piauhy has an area of 301,795 square kilometers with a population of 202,222 inhabitants, and is bounded on the north by the Atlantic Ocean, on the east by Ceará and Pernambuco on the south by Bahia and Goyaz, and on the west by Maranhão.

Piauhy lies almost wholly in the interior. It is the Bolivia of the eastern coast, having access to the Atlantic through the port of Amarração. Beyond the neck or narrow strip of land by which the State is joined to the coast it stretches away into mountainous regions and vast plains suitable for breeding purposes, and miles upon miles of unoccupied lands where only Indians find shelter. Extensive breeding lands in Piauhy belong to the Federal Government. A large plantation called São Pedro de Alcantara was established there after the abolition of slavery for the purpose of instructing the freed slaves in agriculture. These lands were afterwards leased to Dr. Antonio José de Sampaio for breeding and dairy purposes. Dr. Sampaio brought over from Europe 40 families of Swiss and Italian immigrants, the first that had entered that State. According to Government reports

the immigrants located at Piauhy are perfectly adapted to their new country, having introduced in that region the custom of cultivating a variety of products instead of devoting their energy to the cultivation of a single product as formerly. On their lands may be seen, in addition to vegetables and cereals, cotton, coffee, mandioca, and other products. The governor, in his message to the State legislature June 1, 1897, referring to this experiment in industrial colonization, says:

"The undertaking of that clever agriculturist, Antonio José de Sampaio, signifies a great conquest for our breeding industry. The principal obstacle to the material development of the State is the lack of funds and labor. * * * Emigration to the Amazon region is causing our land to be depopulated and luring away skilled labor that might be employed in improving our undeveloped agriculture. It is useless to deceive the public by seductive promises of foreign immigration and colonization. I believe that the State should establish agricultural colonies of Brazilian subjects. It is the only practical way suggested to me by a study of our general conditions of prosperity."

The population of the State of Piauhy is so small that its two leading cities, Parnahyba and Therezina, the capital, have only 12,000 and 10,000 inhabitants, respectively.

The receipts for 1896 amounted to 655,810 *milreis* and the expenditures to 674,827 *milreis*, leaving a deficit of 19,017 *milreis*. The receipts for 1897 were estimated at 694,870 *milreis* and the expenditures at 800,727 *milreis*.

The foreign trade of the State is carried on by means of the steamers of the Liverpool and Maranhão Steamship Company, which have a monthly service with Tutoyo, the port of Parnahyba, which is 93 miles up the Parnahyba River. Cargoes are discharged at Tutoyo in lighters, which are towed by steam launches to Parnahyba. The exports from the State are principally hides, cotton, and maniçoba rubber. The value of these products sent abroad via Pernambuco in 1899 was $414,081. However, other exports were sent out via Pará, Maranhão, and Ceará, which, it is estimated, would bring the aggregate up to $500,000, United States currency. The export duties average 10 per cent on the official value of the merchandise.

The communication inland from Parnahyba is carried on chiefly by means of river steamers. There is telegraphic communication, however, with all parts of the country from this city. Commercial travelers pay a small municipal tax. The goods of foreign manufacture most in demand are prints, white sheetings, and threads.

The State of Rio de Janeiro, where the Federal district is situated, measures 68,982 square kilometers, and has a population of 1,227,575 inhabitants. Its boundaries are, on the north the State of Espirito-Santo, Minas-Geraes on the west, the Atlantic on the east, and São Paulo and the Atlantic on the south.

The State is formed by the valley of the Parahyba River, the head

waters of which are in the plateau of São Paulo. It is bounded by lofty ranges of mountains and is divided into three zones or sections, namely, the sugar zone, the coffee zone, and the cool zone, corresponding to the warm lowlands, the sides of the mountains, and the cool plateaus.

The spacious bay of Guanabara, containing 100 islands and covering an area of 429 square kilometers, is the main feature of this portion of the coast. This vast harbor is surrounded by thick forests and lofty mountains. The bay is in the form of a semicircle, and on its banks are the Federal capital and Nictheroy, the former State capital.

The principal mountains of the State are the Mantiqueira Range, the highest point of which, Itatiaya Mountain (3,000 meters), borders upon the State of São Paulo and the Orgão Mountains, a spur of the Serra do Mar of São Paulo, which extends along one side of the Parahyba Valley. The Orgão Mountains, so called from the resemblance of its peaks to the pipes of an organ, furnish the background for the bay of Rio de Janeiro. Its loftiest peak is Pedra Assú, which has an altitude of 2,232 meters. A railway extending from Nictheroy to Nova Friburgo (originally a Swiss colony and a delightful place of residence) crosses the Orgão Mountains at an elevation of 1,096 meters. The length of the Parahyba River is 950 kilometers, of which only 80 kilometers are navigable. Its basin covers an area of 64,000 square kilometers. Along the banks of the river are many cities and towns which serve as markets for the large number of coffee plantations in the State. Campos, the principal city, with a population of about 20,000, is situated in a region of wonderful fertility, at a distance of 60 kilometers from the ocean, at the head of navigation of the Parahyba River. Campos is the distributing point for the goods brought into the valley. From here also are exported annually from 50,000 to 60,000 tons of sugar. Owing to the limited extent of river navigation, there being no large rivers in the State except the Parahyba, there has been a great development in the railways. They tend in the direction of the port of Rio de Janeiro, which draws the trade from other less favored ports of the coast.

Coffee is the principal agricultural product of the State. The Secretary of Agriculture in his report for 1896 pointed out the disadvantages resulting from the cultivation of a single product, recommending as a remedy the establishment of agricultural centers, such as experiment stations or model plantations and other similar institutions and schools, for the practical study of agricultural methods. An institution of this kind has already been established at Vargem Alegre, between Southern Parahyba and Rezende, at an elevation of 360 meters, having an area of 1,300 hectares.

The exports of coffee from the State for 1899, according to the report

of the Secretary of the Treasury for 1900, amounted to 87,105,716 kilograms, valued at 66,697,610 *milreis*, as follows:

Destination.	Kilograms.	Value.
		Milreis.
Lisbon	7,606	5,948
Hamburg	6,870,283	5,000,671
Antwerp	992,095	735,253
Trieste	1,017,571	761,530
Italy	3,399,623	2,542,671
France	2,942,255	2,197,543
England	802,064	578,381
Austria and Constantinople	1,026,074	801,978
Cape of Good Hope	763,905	581,792
New York	45,178,370	35,211,474
New Orleans	6,106,660	4,584,182
Baltimore	3,055,988	2,349,235
Chile	131,406	94,572
Buenos Ayres and Montevideo	3,151,373	2,421,100
Northern Brazilian ports	8,312,717	6,277,071
Southern Brazilian ports	3,347,636	2,554,203
Total	87,105,716	66,697,604

The State has been very successful in its efforts to introduce immigrants. The last Agricultural Exposition at Rio de Janeiro, under the auspices of the Sociedade Nacional de Agricultura, contained exhibits of vegetables and fruits, beans, tomatoes, carrots, asparagus, strawberries, and celery produced in the vicinity of Rio, proving the land to be well adapted for small farming. The Companhia Centros Pastoris do Brazil, which was formerly engaged in the cattle and dairy industry, has begun to cultivate cereals on the plantation of Urbana, in the municipal district of Vassouras, with excellent results.

According to the Boletim do Serviço de Estatistica Commercial the exports of Rio de Janeiro during the first six months of 1900 were valued at 89,152,433 *milreis*, as follows: Animals and animal products, 2,571,880; minerals and mineral products, 10,998,413; vegetables and products, 74,029,601; specie, 1,552,539 *milreis*, or 87,599,894 *milreis* exclusive of specie. During the same period the number of steamships entered in the port of Rio de Janeiro was 691, with a total tonnage of 900,350, and the sailing, 704 steamers, with an aggregate tonnage of 915,696 tons, while the number of arrivals and sailing of sailing vessels was 203 and 218, with a tonnage of 60,643 and 65,452, respectively.

The population of the principal cities of the State in 1892 was as follows: Nictheroy, 36,000; Rio Bonito, 21,000; Itaborahy, 18,200; Rezende, 16,000; Sao Fidelis, 14,500; Barra Mansa, 12,200; Petropolis, 12,200. The latter city was originally a German colony, but later became the summer residence of the court and is now the capital of the State.

The State of Rio Grande do Norte has an area of 57,485 square kilometers and a population of 313,979. It is bounded on the north and east by the Atlantic Ocean, by Ceará on the west, and Parahyba on

the south. This State as well as the State of Parahyba is traversed by the Piranhas River, at whose mouth is situated the port of Macáo, through which are exported large quantities of salt. The principal port of the State is Natal, also the capital of the State, situated in the estuary of the Rio Grande. Natal is nearest Cape São Roque, the most eastern point of South America, and through it pass the exports of the State, although large vessels are unable to approach the wharves. The principal exports are cotton, leather, mangabeira rubber, cheese, castor-oil seeds, woods, and sugar. An English company proposes building a railway to connect the rich valley of Ceará Mirim with the capital of the State, for which the sum of 120,000 *milreis* has already been subscribed. The Ceará Mirim Valley is remarkable for its fertility, and beyond the coast zone the climate of both States is excellent. The price of land is very low, as may be seen from article 37 of the Land Law of the State of Rio Grande do Norte:

"State lands shall be sold at public auction in the presence of a treasury board or council, subject to the approval of the Governor of the State, by lots previously measured and marked in accordance with the provisions of the preceding chapter.

"(1) Lots shall be sold for the following prices: Land suitable for agricultural purposes, 5 *milreis* per hectare; land for grazing purposes, 1 *milreis* per hectare; suburban lots, 10 *milreis* per hectare.

"(2) Suburban lots are those lying within a radius of 2 kilometers of the city limits.

"(3) When the sale has been effected, the purchaser shall acquire title to the same by the payment of the required fees and taxes."

A railroad runs south from Natal, in the State of Rio Grande do Norte, to the frontier of Parahyba, serving the most populous and productive district of the State.

The exports of Rio Grande do Norte during the year 1899 have been officially estimated at 8,213,638 *milreis*, the principal items being salt, cotton, and sugar.

The population of the leading cities of Rio Grande do Norte is as follows: Natal, 6,000 inhabitants; Macáo, 5,000; Ceará Mirim, 4,000; Mossoró, 3,000.

The State of Rio Grande do Sul, 236,553 square kilometers in extent, has a population of 880,878,[1] and is bounded on the north by Santa Catharina and Parana, Uruguay on the south, the Atlantic on the east, and Uruguay and the Argentine Republic on the west.

For the State of Rio Grande do Sul is reserved a brilliant future on account of its temperate climate and its agricultural and mineral wealth. The restless, energetic spirit of its people will contribute not a little to this result when it is directed toward developing the resources of the State.

[1] In 1900 the population officially estimated was 968,231 inhabitants.

Rio Grande do Sul is the extreme southern State of the Republic. It is separated from Argentina by the Uruguay River and from Uruguay by the Chuy River and Lake Mirim as far as the mouth of the Jaguarão River, the rest of the boundary being purely conventional. The early settlements in the State were made by the Portuguese, but after the independence of Brazil, Germans located here in large numbers, and in recent years there have been a great many Italian, Spanish, and Slav immigrants to the State. The report of the director of statistics for 1895 gives the total number of immigrants who entered the State between the years 1886 and 1894 as 75,766, principally Germans, Italians, and Poles.

The topography of the State of Rio Grande do Sul is similar to that of the States lying to the north. There is a low zone running parallel to the coast, and an elevated zone, about 700 meters above sea level, gently sloping toward Uruguay. Along the coast are lagoons or expanses of water separated from the ocean by narrow sandy strips of land. Their waters have been made either fresh or brackish by the rivers that flow into them. This chain of lakes begins with Tubarão Lake, in the State of Santa Catharina. In Rio Grande do Sul there is a second chain of lakes which unites with the great ocean lake, Lagôa dos Patos, having an area of nearly 9,000 square kilometers. Lagôa Mirim, in the southern part of this State, also belongs to this chain. It is 200 kilometers long and is connected with Lagôa dos Patos by the Sangradouro Canal. There is a regular steamer service on these two lakes.

The railway between Rio Grande and Pelotas extends westward along the Uruguay frontier as far as Bagé, in the Rio Negro Valley. By extending this line northward as far as Cacequy it will connect with another line that has already been prolonged to this point and which is to extend to Uruguayana, the principal city in the northeastern part of the State. The southern and western parts of the State are the most thickly settled. The cities become less and less important as one nears the valley of the Uruguay. The Uruguay River bounds the State on the northeast and northwest. This river may be said to belong to Brazil, since its head waters are in the Mar range of mountains and the greater part of its course is through Brazilian territory. Its navigation is obstructed by rapids above Salto, a city of the Oriental Republic.

The banks of the Uruguay and that part of the Serra do Mar north of the Jacuhy River, as well as the Herval and dos Tapes ranges, south of this river, are covered with dense forests. The western and central parts of the State consist of plains, while in the southern part of the State are savannas like those of Argentina. The flora of Rio Grande do Sul is similar to that of Argentina, being readily confounded with that of the latter country.

There are seven railway lines in operation in the State whose

total length is 1,529 kilometers. The principal railway is the Porto Alegre-Uruguayana. This belongs to the Federal Government but is leased to a Belgian company. The total length of this line now in operation, including the branch line from Cacequy to São Gabriel and Bagé is 497.8 kilometers. A number of concessions have been granted for the construction of railways in the State, but little progress has been made owing to the fact that the time of some of these concessions has already expired and work on others has been retarded. Work continues on the Itararé-Cruz Alta railway, which extends from São Paulo, crossing the States of Paraná and Santa Catharina, to Rio Grande do Sul. The concessionaire of this railroad is the Companhia S. Paulo and Rio Grande. Its total length is 2,541 kilometers, of which 381 kilometers are in process of construction, 1,384 kilometers are surveyed, and 775 kilometers are yet to be surveyed.

Porto Alegre, the capital of the State, is situated at the northern end of Lagôa dos Patos. It has a population of above 100,000. At the southern extremity or outlet of this lake is the port of Rio Grande, which is very difficult of access. Its population is over 26,000 and is connected by rail with Pelotas, the second city of the State. The Jacuhy River, which is navigable below its great fall, empties into Lagôa dos Patos near Porto Alegre. Porto Alegre is a delightful city and a commercial and industrial center of considerable importance. It is built on rolling ground in the form of an amphitheater. On the Jacuhy River, near the city, are the coal mines of São Jeronymo. These mines have not been operated to a very great depth. The quality of the coal improves with the depth of mine. This coal is used as fuel by some railroads in the State. The output of the mines has increased from 3,394 tons in 1892 to 16,548 tons in 1899. A railway runs west along the valley of the Ibicuy Grande, passing through the manufacturing towns of Rio Pardo and Cachoeira, by which products of the western plains are brought to the capital. Another line extends north, connecting the German centers of São Leopoldo and Novo Hamburgo with Porto Alegre, their natural market. In order to facilitate the foreign trade of the capital, which is rendered difficult by the numerous obstructions in the harbor of Rio Grande, it is proposed to connect Porto Alegre with the port of Torres by means of the chain of lakes which extend in a northeasterly direction from Lagôa dos Patos to the lagoon of Tubarão and building breakwaters there. A railway line has been also projected between both points. In order to improve the harbor of Rio Grande it will be necessary to build two parallel moles 6 meters deep and dredge between them a channel 400 meters wide and 8 meters deep. The representative of a company of French and Belgian capitalists and manufacturers has proposed to build an artificial port at Chuy, to be connected with the existing lines of railways, and also to establish colonies along the new railway.

Pelotas is the center of the dried-meat industry, which is the principal product of the State. The extensive pasture lands of the State favor the stock-raising industry. Four hundred thousand head of cattle are killed in the slaughterhouses of Pelotas every year. There are also similar establishments at Santa Maria, Cruz Alta, Bagé, and San Gabriel. The refuse is utilized in the manufacture of soap, candles, and fertilizers. The total value of the trade of Rio Grande do Sul in 1898 was 62,583,129 *milreis*. The trade is largely in the hands of Germans, who constitute one-eighth of the entire population of the State.

In 1900 there were 839 public schools in the State, with an attendance of 35,000.

The climate of the State is healthy. The mean daily temperature of the State from 1893 to 1898 was about 64° F. (17° C.), the absolute maximum on a single day was 92° F. (36° C.); the absolute minimum was 27° F. The temperature falls below the freezing point for several days in the year. The mean rainfall during the same period was 1.268 millimeters.

Immigration in Rio Grande do Sul is voluntary, i. e., the State government does not extend any pecuniary aid.

The State of Santa Catharina measures 74,156 square kilometers in extent, with a population of 259,802. Its boundaries are Paraná to the north and west, Rio Grande do Sul to the south, and the Atlantic to the east.

The growth of the State of Santa Catharina is due almost entirely to foreign immigrants, especially to the Germans. Its two principal colonial centers, Joinville and Blumenau, whose flourishing condition have frequently been described, have a population of over 2,500 and 5,000, respectively. The colonists are engaged in the manufacture of beer and the cultivation of mate, tobacco, corn, and mandioca. Butter is also manufactured on a large scale. The State Legislature has passed a bill which gives premiums as high as 15 *contos* to agriculturists producing a given quantity of wheat, tea, and sugar. To the farmer who first produces 50,000 kilograms of wheat in one year is given a premium of 15 *contos;* to the one producing 10,000 kilograms, 5 *contos*. The premiums given to manufacturers of flour of good quality are increased 25 per cent. The sugar mill that first produces 200,000 kilograms of sugar in a single year is entitled to a premium of 10 *contos;* the sugar mill producing 100,000 kilograms, a premium of 5 *contos*, and for the production of 50,000 kilograms, a premium of 2,500 *milreis* is given. A premium of 2,500 *milreis* is given to the agriculturist who shall first produce 1,000 kilograms of prepared tea which sells in the market for one-half the price of imported tea.

The coast zone of the State of Santa Catharina is much wider than that of the two more northern States of Paraná and São Paulo, its climatic conditions being also very much better. Nearly the entire

population of the State is concentrated in this zone, there being no city of any size in the plateaus. Lages, the principal town of the plains, is the center of the stock-raising industry. About 300,000 head of cattle are dispatched overland from here toward Sorocaba every year. The plains, which are drained by the Tubarão River, have assumed a certain importance in recent years on account of the discovery of coal beds in the Serra Geral, in the upper part of the river. These lie very near the surface, and are easily worked. It is estimated that they will yield at least 50,000,000 tons of coal. A railway 111 kilometers long, built especially for the transportation of this coal, extends through the Tubarão Valley and afterwards divides, one branch running to the port of Imbituba, in the northern part of the State, and another to Laguna, in the southern part of the State. The Laranjeiras Viaduct, on this road, is one of the greatest engineering works of South America, having a length of 1,430 meters.

The capital of Santa Catharina is called officially Florianopolis, although it is better known by the old historical name of Desterro. It has a population of over 15,000, and during the revolt of the navy it was the seat of the rebellion. It is situated on a long and narrow island near the mainland. Its trade is effected through the port of São Francisco, which is one of the best of the coast.

The exports of Santa Catharina in 1899 amounted to 10,172,265 *milreis*, the principal items being rice, sugar, coffee, manufactured tobacco, and mate.

The State of São Paulo has an area of 290,876 square kilometers, with a population of 1,310,000. Its boundaries are: Minas Geraes on the north and west, Paraná and the Atlantic on the south, Rio de Janeiro on the east, and Matto Grosso on the west.

The State of São Paulo is the most progressive State of Brazil, owing to the strong current of immigration which has flowed to it and the great wealth which its principal—or rather, its almost exclusive—product, coffee, has always represented. The energy and enterprise of the people of São Paulo are traditional.

São Paulo is geographically united with the two smaller coast States of Paraná and Santa Catharina. The genial climate of the plateau, which extends from near the coast to the Paraná River, prevails throughout the State. Near the Paraná River, which separates São Paulo from Matto Grosso, is a large section of unsettled and fertile land, constituting a reserve for the future growth of the State. The prosperity of São Paulo is due to the great extent of its railways, as this State has the best railway system in Brazil.

The coast zone of the States of São Paulo and Paraná is entirely tropical. The elevated land adjoining leads by an abrupt ascent to the plateau which enjoys a climate similar to that of Europe, its vegetation differing from the luxuriant growth of the coast zone. Paraná was formerly a part of São Paulo, but during the Empire it was trans-

formed into a province. The Cubatão range of mountains, which lies between Santos—the leading seaport of São Paulo and one of the busiest of South America—and the capital of the State, was the first to be penetrated by a railway, which crosses at the height of 799 meters. This railway was constructed by an English company and is a notable piece of engineering. A study of the topography of São Paulo shows that the country is hilly and broken, cut by the valleys of its river system, and traversed by the various spurs of the Mar range of mountains, the average height of which is 1,000 meters in São Paulo and 1,500 meters in Paraná.

The railway extending from the port of Paranaguá to Curitiba, capital of Paraná, passes through tunnels at the height of 955 meters. The Mantiqueira Range, in the interior of São Paulo, continues parallel to the Mar range, but under a different name. Generally, its elevations are not so high in São Paulo as in Rio de Janeiro, although in the plateau of Campos do Jordão one of its peaks attains a height of 1,782 meters.

The soil of São Paulo is extremely fertile. Its red soil, which in some places is from 20 to 40 meters in depth, is peculiarly adapted to the cultivation of coffee, which constitutes the principal product of the State. The winters in the southern part of São Paulo are very cold. In the upper valley of the Paranapanema River frosts occurred 14 times during the winter of 1886. At the capital of the State fogs are frequent, and the temperature at times falls below 0° C. (32° F.). In the plains of the interior the temperature falls still lower, while Paraná and Santa Catharina are subject to snow falls and cutting north winds.

As stated, São Paulo is one of the most prosperous States in Brazil. It is evident that this prosperity could not have been attained without the aid of immigration, which has contributed so liberally toward making São Paulo one of the first if not the first State of the Republic. Dr. Campos Salles, actual President of the Republic, when Governor of the State, made the following reference to immigration in his message of the 7th of April, 1897:

"The immigration service merits the particular attention of the Government, inasmuch as foreign labor constitutes the principal factor in our agricultural production. The Federal Government, as you are aware, has rescinded its contracts for the introduction of immigrants, the task of promoting immigration in the future being left exclusively to the State. The Government has thus relieved itself of a heavy burden, which was a serious charge on the Treasury. Nevertheless, during the year 1896 the total immigration into the State numbered 74,918, of which 42,661 came at the expense of the Government and the rest at the cost of the State. These figures added to those of former years, beginning with the immigration of 1827, show a total immigration to the State of 700,211. Of this number

493,535 were Italians and the rest Portuguese, Spaniards, Germans, Austrians," etc.

The total production of the several colonial settlements for 1895 was valued at 1,575,417 *milreis*.

The leading cities of São Paulo are São Paulo, the capital, and Santos. São Paulo is one of the most beautiful and prosperous cities of the Republic. It has already a population of over 260,000 and is spread over an area of 25 square kilometers. It has had a remarkable growth in recent years, there having been erected a large number of public buildings and private residences. Fully two-thirds of the present city has been built within the last few years.

Taken as a whole, São Paulo is a modern city with all the defects and all the advantages common to cities of rapid growth. The manufacturing industries of São Paulo include all the articles of consumption and ordinary use. The agricultural colonies of São Bernardo, São Caetano, and Sant'Anna supply the markets of the city with vegetables and fruits, and the Cayeiras or limekilns situated in the mountains north of the city, employing a large force of laborers, prepare all the material for the building of the new districts. São Paulo also seeks to favor the establishment of the glass industry, for the manufacture of which there is an abundant supply of raw material in the silican beds found in the bottom of the lakes which formerly existed at the head of the Tieté River and its affluents, while the turf which has gradually formed in the lakes and marshes of the plains supplies the necessary fuel.

Santos has a population of 41,000. It is built on an island, which is separated from the mainland by a narrow channel. Formerly it was an extremely unhealthy city, subject to terrible epidemics of yellow fever, but, owing to the important harbor works completed a few years since, this evil has been almost entirely eliminated. Improvements have recently been made in the harbor by the Companhia de Docas of Santos, thereby increasing the trade of this port. São Paulo has a number of other important cities. Taubaté, a town of 32,000 inhabitants, is situated in the Parahyba Valley, through which runs the railway from Rio de Janeiro to São Paulo. It is destined to become the depot for the coffee of the eastern part of the State. It is surrounded by manufacturing establishments and plantations, and the bitumen mines found in the vicinity supply petroleum and gas for local consumption. The branch line of the main line at Taubaté, which is being extended in one direction as far as the seaport of Ubatúba, and in the other to Campinas, the rival city of Santos in the export of coffee from the plateaus, will greatly change the existing trade conditions of the State. A railway is also projected from Mogy das Cruzes, ascending the Tieté Valley, crossing the Serra do Mar and extending down to the port of São Sebastião. This is a well-protected port near the bay, having a depth of from 20 to 30 meters.

Campinas is a city of 64,000 inhabitants and is the leading center of the northern part of the State. It has an extensive trade and possesses some fine residences and an agricultural school. It is also a literary center. Sorocaba, a small town west of São Paulo, is well known as a fair or market for animals, especially for mules from Rio Grande. This trade has declined, however, as mules are now sold directly to purchasers. Generally speaking the cities of São Paulo, Rio Claro, Itú, Piracicaba, Botucatú, etc., give an impression of thrift.

During the year 1899 the exports of the State of São Paulo, according to Brazilian official statistics, amounted to 268,671,867 *milreis*, coffee entering into this amount for the sum of 249,559,450 *milreis*, represented by 6,078,990 bags, weighing 344,138,817 kilograms. The movement of the port of Santos during the same year was as follows: Number of arrivals: Steam vessels, 698, with a tonnage of 947,770; sail, 174, tonnage 87,988; departures, steam vessels, 685, tonnage 927,262; sail, 169, tonnage 85,243; immigrants arrived, 11,312.

During the first six months of 1900, according to Brazilian official statistics, the exports through the port of Santos amounted to 89,705,641 *milreis*, as follows: Animals and animal products, 359,284; minerals and products, 63,124; vegetables and products, 89,293,233, of which coffee is represented by the amount of 88,594,682 *milreis*.

The State of Sergipe has an area of 39,090 square kilometers, with a population of over 648,009. The boundaries are Alagoas on the north, Bahia on the west and south, and the Atlantic Ocean on the east. The physical features of Sergipe are the same as those of Bahia and Alagoas. The capital, Aracajú, 12 kilometers above the mouth of the river, has a population of about 15,000. This is a port of commercial importance, notwithstanding the difficulty of approaching its harbor. Large quantities of sugar are exported from this port. There is a railroad extending north as far as Capella and west as far as Simão Diaz.

During the year 1899 the exports of Sergipe were valued at 7,881,533 *milreis*, the main item being sugar for 5,950,490 *milreis*. For the first six months of 1900 the exports were officially estimated at 51,321 *milreis*, sugar being represented by 95,260 kilograms, valued at 24,022 *milreis*, and rubber by 6,415 kilograms, worth 12,977 *milreis*.

CHAPTER VII.

AGRICULTURE AND STOCK BREEDING.

Brazil from its physical nature, as well as from the character of its inhabitants, is essentially an agricultural country. This does not mean that the extent of cultivated territory is large or that there is great diversity of production. On the contrary, the greater part of Brazil is still waiting for the husbandman to take advantage of its wonderful fertility, and only a small number of products are cultivated to a considerable extent. This agricultural exclusivism is the greatest economic evil of Brazil, since from agriculture are derived the principal resources of the country. The farmer raises, in addition to the one product from which he derives his income, a little patch of mandioca, beans, rice, potatoes, corn, etc., barely sufficient for the needs of his own family, it never occurring to him to cultivate these products on a larger scale and thereby add to his income. Ignorant and conservative, he is content to exist from day to day, destroying splendid forests in order to establish his *roça* (vegetable garden), and abandoning it without hesitation when the land no longer yields as abundantly as formerly, owing to the primitive methods employed in its cultivation. The vast extent of territory and the fertility of the soil throughout Brazil render it easy for these changes to be made. This method has been rightfully called "pillage of the soil," for no sooner is the primitive fertility of the land exhausted than it is abandoned to weeds.

Brazil is preeminently a coffee-producing country, the tree being introduced into Pará from Cayenne in 1727. While coffee can be raised in nearly all parts of the country, its cultivation in the present century has been limited to a comparatively small zone, comprising the four States of Espirito Santo, Minas Geraes, Rio de Janeiro, and São Paulo. It is produced in other States, but in small quantities. The soil of Rio de Janeiro being already somewhat exhausted, São Paulo is in reality the great center of production of this precious plant. Brazil furnishes more than 60 per cent of the world's consumption of coffee, and it is claimed by some that the percentage is as high as 70 per cent. In 1890 Brazil produced 490,000 tons; Central America and Mexico, 80,000; Java and Sumatra, 60,000; Haiti and Santo Domingo, 43,000; Cuba and Porto Rico, 35,000; India, 30,000; Africa, 20,000; other countries, 100,000. In 1898 the production of Brazil was estimated at 1,533,840,000 pounds, or 11,620,000 bags, out of a total production of 1,960,619,288 pounds for all America, while Asia and Africa produced only 145,464,000 pounds, or 1,102,000 bags.[1]

[1] Bulletin of the Bureau of American Republics, Vol. VI, No. 11, 1899, p. 1949.

Brazilian coffee is the richest in caffeine, as may be seen from the following table, which gives the analysis of 500 grams of each of the different varieties of coffee:

	Grams.
Yellow coffee of Brazil	1.82
Martinique	1.79
Egyptian	1.21
Java	1.26
Mocha	1.06
Cayenne	1.00
Santo Domingo	.89

For the cultivation of the coffee tree, wild, uncultivated lands, hillsides, or elevated lands are preferred. These are cleared of their trees and brushwood, and plants 1 year old are planted, averaging 400 to the acre. The plant does not begin to produce until it is 4 years old, its maximum production being reached between the ages of 6 and 20 years, after which it diminishes in productiveness. When the trees reach the age of 35 or 40 years it is generally necessary to renew the plantation. The coffee tree attains an average height of 10 feet and its head a diameter of 5 feet. It blossoms and yields a crop twice a year, but the most important is that beginning in April or May and continuing to November. The only fertilizers used are the leaves of the coffee tree, the shells of the berry, and weeds, as it is necessary to keep the plantations free from all extraneous matter. The tree should be protected from the cold south winds. Its worst enemy is frost, which sometimes causes the tree to cease producing for a number of years, occasioning greater losses than the parasitical diseases with which it is afflicted. An ordinary tree yields from one-third to three-fourths of a kilogram of hulled coffee, while exceptional trees yield as much as 15 kilograms.

The berry resembles very closely the cranberry, and contains two grains, with their flattened sides toward each other. Each of the two is covered with a closely adhering membrane called *pergaminho*, and outside of this is a thicker and more loosely fitting coat called *casquinha*. The two grains with their coverings are contained in a tough shell called *casca*, and this is surrounded by a white pulp and outer red skin, thus forming the berry.

To prepare the coffee for market, all these coverings must be removed. The outer pulp is removed, after maceration in water, by a machine called *despolpador*. A trough lined with cement is placed on a hillside above the mill, and through it a stream of water is kept running. Into this the coffee berries are thrown and are carried down by the stream into a large vat. In this vat the heavier berries sink to the bottom, whence they are drawn off through a pipe to the *despolpador*. This machine removes the pulp, the berries passing with the water to another vat beyond, where the pulp is thoroughly washed off and carried away with the water, while the coffee grains sink to the bottom,

and thence passing to a strainer the water is all drained off, leaving them ready for the process of drying.

Two methods of drying are in use; the old process, which consists in spreading the grains on a cement-covered pavement called *terreiro*, where they are allowed to dry in the sun. For this about two months are necessary, and the grains have to be raked over and turned during the day and gathered into piles and covered at night, or whenever a shower comes. The more modern and satisfactory process of drying by steam is employed on many of the larger plantations. By this process the drying, which by the old method requires about sixty days, is accomplished in a few hours, with a vast economy of labor. Under this system drying is done in large, shallow pans of zinc heated by steam coils beneath more uniformly and with no danger of injury from sudden rain.

The coffee, after drying, is still inclosed in the inner and outer skins, which have been rendered more brittle by the drying. The machinery necessary for the removal of this is somewhat complicated and expensive. The most efficient of the machines in use are from the United States, and a complete plant for a large plantation will cost not less than $25,000. The coffee is brought from the drying house and placed in bins, whence it is carried to a ventilator, where it is rid of rubbish and dust by sifting and fanning. From the ventilator the coffee is carried to the sheller (*descascador*). The grains and broken husks are carried by a pipe to a second ventilator, where the latter are sifted out and fanned away, and the former are carried by an elevator to the separator. This is composed of hollow copper cylinders, pierced with holes of different shapes and sizes. These cylinders are kept constantly revolving, and the coffee grains, passing through the holes, fall into separate bins, being thus assorted according to their size and shape.

The coffee thus mechanically classified goes into the markets of the world, where it is sold, the small, round grains as Mocha, the large flat grains as Java. A small portion of the *pergaminho* which still remains is removed by the *brunidor* (polisher) by trituration and fanning. Finally, after passing through all this series of machines, the coffee is carefully picked over by hand and is ready to be put into bags.

As an indication of the extent to which coffee cultivation is pursued in Brazil, the Secretary of Agriculture of the São Paulo Government may be quoted:

"There are in Sao Paulo 15,075 plantations, of which 11,234 have upward of 50,000 trees; 1,844 possess from 50,000 to 100,000; 999 between 100,000 and 200,000; 597 from 200,000 to 500,000 trees. On these plantations 1,703 machines are to be found for cleaning coffee, 1,243 of which are moved by steam and 460 by water. The registered mortgage debt on these plantations is computed at 240,000,000 *milreis*, about $38,922,000, at an exchange rate of 8d.

"In Minas Geraes it is said that there are 2,739 coffee plantations, 1,234 with less than 50,000 coffee trees each, 844 with over 100,000 trees each, and 64 of over 500,000 trees each. Of these plantations 500 use water power and 1,243 steam."

The planters complain that only their inferior grades of coffee are known abroad in their true character, their better qualities being sold under the disguise of such titles as Mocha, Java, Martinique, etc. These better sorts, which cost in Rio and Santos 35 *francs* per 50 kilos (about 3d. per pound), are sold on the European markets, in consideration of their reputed origin, for 80, 90, and 100 *francs* per 50 kilos. Very generally they are mixed with a proportion of the real article indicated by the name. It is even said that this spurious trade is strengthened by the shipment of Brazilian coffees from various parts of Europe to Egypt, and thence to Arabia, via Aden and Jeddah, etc., so that it may there be packed in Mocha fashion, after which it is shipped to Syria or other places, or returned to Egypt as genuine Mocha. The result of this plan, according to the statement published, is that good Santos coffee, sold in Brazil for 6 *francs* per 10 kilos, is sold in bulk in Egypt at 9.50 *francs*, retailed at 10.50 *francs* per 10 kilos, and, when transformed into "real Arabian Mocha," fetches 5 *francs* per kilo.

The total production of coffee in Brazil from 1889–90 to 1899–1900 has been as follows, in round numbers:

Crop.	Bags of 60 kilograms.	Crop.	Bags of 60 kilograms.
1889–90	4,622,000	1895–96	6,000,000
1890–91	5,547,000	1896–97	8,500,000
1891–92	7,596,000	1897–98	11,000,000
1892–93	6,111,000	1898–99	9,000,000
1893–94	4,840,000	1899–1900	11,000,000
1894–95	6,977,000		

Another product of which Brazil is the leading producer and of which she has almost a monopoly, both in quantity and in quality, is rubber. Its utilization as an industry amounts to almost nothing in the country. The gathering of the rubber is very simple. An incision is made in the trunk of the rubber tree, from which the milky juice flows into a clay cup placed underneath. The rubber is prepared from this thick, sticky juice by dipping a stick repeatedly into it and holding the juice adhering to it in a dense smoke in order to hasten the coagulation and drying. A great quantity of the rubber is extracted by the inhabitants of Ceará and Maranhão, who during the dry season flock to the rubber forests in the large States of Pará and Amazonas, where small trading centers have been established. These are reached by steamboats which ascend the river and its tributaries and penetrate far into the forests, following the numberless streams that flow into the Amazon and its branches. The rubber produced in 1840 amounted to only 400 tons, while in 1860 it amounted to 2,500 tons

and in 1891 to 20,000 tons. Pará and Amazonas are the greatest producers, but rubber is now being exported in considerable quantity also from Bahia, Ceará, Maranhão, and Matto grosso. Formerly more attention was paid to the production of coffee, but in recent years, because of the increased area devoted to it, prices have declined. It is not so with rubber, for while the production of this forest tree, indigenous to almost the whole country, has increased with astonishing rapidity, prices have not only been maintained, but have moved steadily upward. Explorers say there is an abundant supply in the yet almost unexplored forests of the interior.

The Government is endeavoring to foster the industry of the cultivation of the plant and the manner of preparing the raw product for the market.

It appears that the principal kinds of rubber found in Brazil are the "maniçoba" (*Manihot glaziovii*), the "mangabeira" (*Hancornia speciosa*), and the "seringueira" (*Hevea brasiliensis*), which is by far the best.

The maniçoba plant is grown in the north of Brazil, especially in Ceará and Rio Grande do Norte and Parahyba. In price this is second to the "seringueira" or Pará rubber, and for certain classes of work is preferred. The interest in the growth of the plant is steadily increasing throughout the three States, and is also extending rapidly throughout Pernambuco, Alagôas, and Bahia, giving better results with less labor than almost any other agricultural pursuit.

The seed is planted at the beginning of the winter, red or brown soil giving the best results. At the time of planting the soil should be neither excessively dry nor wet. Once the tree has reached the age of two years it can resist any weather, but the amount of milk will always more or less depend on the climatic influence. At six years the plant will have reached its maturity, which is the time best suited for tapping, though this may be begun at the age of two years. After six years the trees will produce annually until the age of thirty years from 2 to 5 kilograms of rubber if in good condition. After thirty years the yield will slightly decrease, the life being at least a century under fair conditions. The sap is prepared in exactly the same manner as the "seringueira" of Pará, but is of a deeper brown color after smoking. The way the greater part of the maniçoba rubber is produced in the States named is simply to cut the bark of the tree, letting the sap run in drops to the base, where, by the action of the sun's rays, it coagulates and forms an irregular solid mass, which is gathered by the natives and sold to the middlemen, by whom it is shipped to America and Europe. Besides the maniçoba, these States produce a great quantity of mangabeira rubber, which is of an inferior grade and is used for covering cables, etc.

The Pará rubber is generally divided in the trade into three grades—fine, medium, and sernamby. The fine grade is the perfect product,

the medium shows either white spots or layers of a creamy color, indicating partial spontaneous coagulation after extraction, and the sernamby is the coagulated milk containing impurities.

According to a United States Consular Report,[1] during the fiscal year 1898–99 there entered the port of Pará 25,374 tons of rubber, against 22,257 in 1897–98, and of this amount, 12,398 tons were shipped to the United States and 12,848 to Europe. The same report contains Brazilian statistics showing that the exports of rubber from Pará for the fiscal year 1898–99, in tons of 2,200 pounds, were as follows: United States, 12,398 tons; Europe, 12,848 tons, or a total of 25,246 tons. The production of rubber in 1860 was, in round numbers, about 2,400 tons, which shows that this industry has increased tenfold. By act No. 463 of the 22d of June, 1900, the Governor of the State of Pernambuco is authorized to pay a premium of 1 *conto* to every farmer owning 5,000 feet of maniçoba trees producing rubber.

From the port of Belem there were exported during the month of June, 1900, 1,940,594 kilograms of rubber, of which 962,353 kilograms were exported to Europe and 978,238 kilograms to the United States. During the first half of the year 1900, the exports of Pará rubber amounted to 10,530,509 kilograms, of which 5,355,128 kilograms were shipped to Europe and 5,175,381 to the United States.

The exports of rubber from Manáos for the same period amounted to 5,433,323 kilograms, of which 3,929,342 kilograms were destined for Europe and 1,504,981 kilograms for the United States.

In October of 1900 the export from the principal States was 2,394,858 kilograms, worth, in round figures, 26,000,000 *milreis*, or $5,400,000 at the average rate of exchange.

Sugar cane was introduced into Brazil from the island of Madeira, and its cultivation became the leading industry of the country in the sixteenth century, Brazilian soil being specially adapted to this industry. But, owing to the extensive cultivation of this product in the European colonies of the Tropics and the active competition of beet sugar in Europe, the price of sugar has been so reduced that the industry yields but small returns. Other causes of the decline of this industry are the high prices of labor that have prevailed since the abolition of slavery. Besides it would hardly withstand competition with coffee, rubber, and other agricultural industries.

The real sugar zone of Brazil extends from Ceará to Rio de Janeiro, Pernambuco being the center of production. There are a large number of factories belonging both to private parties and to corporations, the former, however, having given the best results. To a large English company the Government gave a guaranty of 7 per cent interest; but owing to the antiquated machinery employed, the company failed. The average sugar production of Brazil is 200,000 tons, valued at

[1] Commercial Relations of the United States during the year 1899, Vol. I, pp. 620-623, Washington, 1900.

80,000,000 francs. In connection with the manufacture of sugar is that of aguardente (brandy), about 100,000 hectoliters of which are produced annually, valued at 4,000,000 francs. Nearly all the sugar and brandy manufactured at the present time is for home consumption, a small quantity of sugar being exported to the United States. An advance in the price of sugar or tariff concessions by other countries would undoubtedly result in greatly increasing the production of sugar. Many planters are already provided with the necessary machinery, and the revival of this industry would be of great benefit to an interesting zone of Brazil, where the present poverty contrasts singularly with its former opulence. The cane is gathered fifteen months after it has been planted, and generally three or four times without renewing the plantation. There are lands, however, of exceptional fertility, such as the valley of Ceará-Mirim, where the plant is produced five times without renewal. The average production is 22 tons per acre.

The cultivation of sugar is confined to the moist coast zone, while cotton thrives in the dry climate of the interior, from Piauhy to Bahia, its cultivation extending to Minas Geraes and São Paulo. The war of secession in the United States gave a great impulse to the cultivation of cotton in Brazil but it declined after peace was declared. The amount of cotton exported in 1872 was 73,000,000 kilograms, while in 1880 the export of this product fell to 13,000,000 kilograms. In 1887 the exports amounted to 23,000,000 kilograms. Renewed interest has been awakened in this industry however, owing to the protection given to domestic cotton goods and to the cotton mills recently established, which already supply the home market with all the ordinary cotton goods. The total production of cotton is estimated at approximately 250,000 bales of 400 pounds, of which 100,000 are manufactured in the country and 150,000 exported to Europe.

The tobacco of Brazil does not have the perfume of Habana tobacco, which is due probably to the conditions of soil and atmosphere, but nevertheless it enjoys great favor, especially the tobacco of Bahia, Minas Geraes, Goyaz, and Pará. Of the annual production a large part is exported to France and Germany for the national manufactories of France (Regie) and Hamburg, and the rest is used in the national factories, nearly all of which are in Bahia.

There are no recent statistics available on the production of the whole country, but we find the Bulletin of Commercial Statistics for the first half of 1900 states that the tobacco exports from Bahia alone amounted in those six months to 17,048,196 kilograms, worth 23,196,494 *milreis*, or $5,000,000 in round figures. Brazil practically does not import tobacco, and considering the large interior consumption and the above exportation from Bahia alone, the total production must be considerable.

Cacao, which is the fruit of the tree botanically known as *Theobroma*

cacao, is exported from Amazonas, Pará, Maranhão, Bahia, and other States. Its systematic cultivation was but recently begun and is very simple, consisting, after the planting of the trees, in keeping down the weeds. About 250 plants are ordinarily planted to the acre. They require to be shaded while growing and produce in the fourth year from planting and during a period of from fifty to eighty years. The annual export for the whole country can not be given, as recent statistics are lacking, but it can be inferred from the following data relating to Bahia found in the reliable publication, Bulletin of Commercial Statistics: Bahia exported in the first six months of 1900, 4,406,196 kilograms. That would amount for this State, which is the leading producer of cacao, to 8,812,392 in the last year. Pará exported in 1895, 5,225,000 kilograms, but its exports have been falling off owing to the almost exclusive production of india rubber. It will be safe to estimate the total Brazilian production above 15,000 tons, that is to say about one-fifth of the universal production. The price of a kilogram of cacao varies between $0.50 and $30. The annual income from a plantation of 50,000 trees is estimated at $60,000.

Mandioca (*Manihot utilissima*), the American cassava, is very abundant and the flour made from this plant is used more or less generally by all classes. This plant is very generally cultivated throughout Brazil and does not require a rich soil, yielding well on sandy land. From the root of this plant, which yields as much as 150 hectolitres per hectare, is made, besides the mandioca flour, tapioca, so largely exported from Brazil, and starch used for cooking or laundry purposes.

Rice grows admirably in the lowlands of the Amazon valley, in Maranhão and in the low coast region of São Paulo and Paraná, but its cultivation is neglected and it is largely imported from Asia and North America.

Tea prospers in Brazil as has been proved by experiments made both recently and in the early history of the country, but it has not been systematically cultivated. Maté (*Illex Paraguayensis*), a good healthy tea, is cultivated extensively in Paraná, Santa Catharina, Rio Grande, and Matto Grosso and consumed in the southern States of Brazil and extensively exported to Argentina and Uruguay. The maté industry occupies a leading position among those of the State of Paraná, both on account of the great quantity exported and the number of laborers employed in its cultivation. The maté is taken by infusion, like tea or coffee, and it is said to be a most nourishing beverage, less stimulating and cheaper than either tea or coffee. The exports of maté amount to nearly 20,000,000 kilograms per annum, valued at over $2,000,000.

The cereals are destined to become the most remunerative and most extensively cultivated products in the interior and southern part of Brazil. But at present they are but little cultivated, with the excep-

tion of corn, which is more or less extensively cultivated throughout Brazil for home consumption. The wheat of Rio Grande do Sul was attacked by rust, discouraging the farmers who, by tradition and by the greater facilities offered, were already inclined to the cattle industry.

Cheese of excellent quality is manufactured in Minas Geraes and some of the northern States, particularly in Piauhy, Ceará, and Rio Grande do Norte.

Owing to its vast extent of territory and consequent diversity of climate, Brazil produces all kinds of fruits, both those of the Tropics and of the Temperate Zone. Some are without rival, as the pine-apple, for example (*Bromelia ananassa* or *Ananassa sativa*), and the *mango* of Pernambuco, the *abacates* (*Persea gratissima*) or alligator pear, which grow in northern Brazil, and the oranges from Bahia and Rio de Janeiro, which have an incomparable sweetness and flavor. Besides their fine quality they are remarkable for their abundance. In the State of Pernambuco, for instance, two enormous crops are produced every year. It would require pages to describe all the kinds of fruit growing in Brazil, including the indigenous and those which have been introduced into the country. Among the best known are the *pinha* or *ata* (*Anona squamosa*), *jaboticaba*, *mangaba* (*Hancornia speciosa*), *goiaba*, the cocoanut, of which the *assahy* or *jussara* (*Euterpe edulis*) is peculiar to Pará and Maranhão, the *sapoti*, *jambo*, *jaca*, bananas, which grow wild, melons, and figs. In southern Brazil, as well as in the highlands of the tropical zone, European fruits are cultivated, such as strawberries, pears, peaches, plums, quinces, etc. The Amazonian valley has a monopoly of the so-called Pará chestnuts, which are the nuts of the *Bertholletia excelsa* and are exported in great quantities to Europe and the United States.

The grape thrives splendidly in Brazil, both in the north and south. The Dutch, who had given to Pernambuco a coat of arms representing a maiden with a mirror in one hand and a sugar cane in the other, to the island of Itamaracá gave a bunch of grapes, so delicious did they find them there. Wine was made in Goyaz in colonial times. The vine, however, has never been systematically cultivated until the present time. A number of the States are beginning to produce wines which, though not of the best quality, are destined to a great future. The time is not far distant when the dream of André Rebouças will be realized. Brazil will be the land of wheat and wine rather than the land of mandioca and rum. The European colonist will thus find there a new *patria*. Minas Geraes in 1892 produced 9,450 hectoliters of wine. The first vintage is gathered five years after the planting of the vines. Wines are also made from the orange, *cajú*, pineapple, and *genipapo* (*genipa americana*).

In the Amazon zone, which is remarkable for the great fertility of its soi which is adapted to the cultivation of all the products of hot climates, from spices to tobacco, coffee, sugar, and rice, natural pro-

ducts especially abound, greatly surpassing the agricultural products. This region exports vanilla, *guaraná* beans, the fruit of the *paulinia sorbilis;* fine woods, such as rosewood (*physocalymna florida*), satinwood (g. *aspidosperma*, *eburneum*, and *sessiliflorum*) *tartaruga* wood (*brosimum discolor*), *jacarandá* (g. *machaerium* and *dalbergia*), and cedar (g. *cedrela*). Its medicinal flora, a large part of which is common to the whole of northern Brazil, is wonderfully rich, including sarsaparilla (*smilax salsaparilla*), *ipecacuanha* (*cephaelis ipecacuanha*), jaborandy (*pilocarpus primatus*), from which *pylocarpina* is extracted; cubeb (*piper cubeba*), curare (*strychnos castelnaei*), nux vomica, etc.

The next zone, or second, according to the division made by André Rebouças, who divided Brazil into ten agricultural zones, is that of Parnahyba, comprising the States of Maranhão and Piauhy, separated by the majestic Parnahyba River. The northern part of Maranhão, which borders upon Pará, possesses lands similar to those of the Amazon zone, and yields the same products—rubber, cacáo, etc. Toward the south the region is characterized by greater diversity of products. The zone of Ceará abounds in textile substances, in which Brazil is very rich, being able to furnish fibers for cloths, paper, ropes, etc. This is the land of the precious palm tree *carnaúba* (*copernicea serifera*), every part of which is utilized. From the leaves are made fans, mats, brooms, baskets, hats, and roofs for cabins. The leaves also give a yellow wax from which candles are manufactured on a large scale. The wood is used for bridge posts and sleepers; the hollow stalk for tubes; the fibers of the stalk for cork; the *palmito* and gum, which resembles sago, for food; the potash made from the ashes is used in the manufacture of soap, and the sap is used as a beverage.

Besides the woods already mentioned there are many others, the principal of which are *acapu* (*wacapona americana*) and *angelica* (*dicorenya paraensis*), which are specially suitable for hydraulic works, as they resist worms; the *bacury* of Maranhão (*platonia insignis*), which is largely used for building purposes; Brazil wood (*echinata caesalpinia*), which is common to the whole of Brazil; vinhatico (*echyrospernium Balthasarii*), which is a species of mahogany and extensively used in cabinetmaking, together with the *gonçalo-alves* (*astronium fraxinifolium*); *tapinhoam* (*sylvia navalium*), resembling oak and much used in shipbuilding and for the manufacture of hogsheads; *potumujú* or *araribá* (*centrolobum robustum e tomentosum*), which is very strong; *peróba* (*aspidosperma peroba*), called Brazilian oak, of which there are entire forests in São Paulo, and a variety of which, *peroba revessa*, is very beautiful and largely used in cabinetmaking; ipê or *pau d'arco* (*tecoma speciosa*), used by the natives for weapons; *itapicurú*, a beautiful cabinet wood from Espirito Santo; pinheiro (*Araucaria Braziliensis*), which grows to a height of from

20 to 36 meters, having a diameter of from 1.30 to 2 meters. The wood of this tree serves chiefly for building purposes and its nuts are excellent food for hogs. In addition to this, the tree yields resin, turpentine, and tar, and from its ashes are obtained potash and soda; *embuia* and the cinnamon tree (g. *nectandra*); the *guarabá* and the *oleo* (*myrospermum*, *myroxylon*), of such great resistance that they are compared to bronze, while other woods have been found in Brazil so flexible that they may be compared to steel; the *aroeira* (*schinus terebentifolius*), which is said to be incorruptible. [1]

The cabinetmaking industry owes its great development in Brazil to the marvelous amount of raw material offered, not only for the furniture of ordinary use, but also for costly furniture, ornamentation, and inlaid work. It would require too much space to enumerate all the other natural products of Brazil, such as its resins, gums, dyestuffs, fibers, hides, etc. However, in closing, we will mention guttapercha, which is obtained from the *jaguá* (*lucuma gigantea*), and the *massaranduba* (*mimusopo elata*); ramie (*candida sidonis*), which has already become acclimated in southern Brazil; silk, produced in Paraná, St. Catharina, and Rio Grande do Sul, by the silkworm introduced from Europe, although the forests of Brazil have their silkworms, the *saturnia aurata* for example, which feeds on the leaves of the *ricino;* the piassava (*atalea funifera*), or black rush, which is exported for the manufacture of brushes and brooms.

Brazil has for a long time produced all the live stock necessary for its home consumption, and some even for exportation, especially to Cuba and other parts of the Antilles. All the States are more or less adapted to stock raising. The attractive industries of coffee, rubber, etc., have, however, diverted the attention of the inhabitants from the development of the flocks and herds to such an extent that some of the northern States now import a part of the meat they consume. There are no exact statistics obtainable, but the number of cattle throughout the country is estimated by experts to be not less than 20,000,000, of which 8,000,000 belong to the State of Rio Grande do Sul. This number could be greatly increased if more attention and better methods were employed. Rio Grande do Sul has several packing houses where meat is prepared for shipment to the northern States. An average of 500,000 head of cattle are annually slaughtered for that purpose. Goyaz, Matto Grosso, and Minas Geraes ship cattle on the hoof to Rio de Janeiro, while Paraná and Santa Catharina send their surplus to São Paulo. Piauhy and Maranhão export to the rubber-producing States of Pará and Amazonas. Horses and fine sheep thrive perfectly in the most southern States, while goats and hogs are extensively raised throughout the entire country. The prospects of Brazil with respect to live stock and other industries can not be too much emphasized.

[1] Les zones agricoles du Brásil en 1889, by André Rebouças.

CHAPTER VIII.

MINING.

Brazil in the last century was very properly considered a land of gold and diamonds. Gold, specimens of which were found by the Paulists as early as the first half of the sixteenth century (1540), exists in almost every State of the Republic, while diamonds of the finest water were sold in Europe as diamonds from India, after having been cut in Amsterdam. The real discovery of gold mines was effected by a party of Paulists in the territory of what is now known as the State of Minas Geraes in 1694. From that year to the end of the eighteenth century Brazil had no rival in mining wealth. It has been estimated [1] that the gold produced by the mines of Brazil from the time of their discovery to 1820 amounted to 960,000 kilograms, worth at least 3,000,000,000 francs (about $600,000,000). One-half of this amount was yielded by the mines of Minas Geraes, one-seventh by Goyaz, and the rest by São Paulo and Matto Grosso. Vernhagen, the author of the standard history of Brazil, states that the gold exported during the eighteenth century, exclusive of what was smuggled, was worth over $300,000,000, while the exports of diamonds during the same period, exclusive of smuggling, weighed 2 quintals (200 pounds).

Gold and diamonds were then found on or very near the surface of the ground. The miners never dug deep pits. At the beginning of the nineteenth century these superficial deposits were practically exhausted. At the same time the more attractive industry of coffee, rubber, etc., led to great neglect in the extraction of gold and precious stones. So the average yield from 1851 to 1870 for exportation was about $1,400,000, and from 1881 to 1885, $600,000. Aside from gold, the exploitation of the vast mineral wealth of the country may be said to be still in its infancy. Copper is mined to some extent in Rio Grande do Sul, and iron and lead in Minas Geraes and São Paulo. Iron is most abundant; it is not found in veins or subterranean strata, but in enormous beds often lying at the surface or in mountain masses hundreds of meters high. Manganese and lead, or argentiferous lead ore, are found in considerable quantities and in widely extended localities. In Santa Catharina are deposits of hematite containing, on an average, 30 per cent of manganese and 25 to 30 per cent of iron.

[1] Le Bresil, Levasseur et Rio Branco, p. 67.

In Goyaz and Minas Geraes itaberite is found, as well as bismuth and antimony, in combination with other minerals.

There are in Minas Geraes, which is the land *par excellence* of minerals, deposits of saltpeter, lodestone, and graphite. One of the deposits of the last-named mineral is said to yield 83 per cent of carbon suitable for pencils, and calamite. Bituminous coal is mined to some extent in Rio Grande do Sul and Santa Catharina, and in São Paulo are found bituminous schist and peat. Several States produce lignite. Some of the salt consumed in the country is imported from Europe, but the salt pits of Rio Grande do Norte, Alagôas, and Sergipe furnish a considerable quantity of this product. Rock salt is mined in Matto Grosso and Goyaz. Marbles are abundant; they are of various colors, and resist the disintegrating influences of the climate. Hot springs abound, especially in Minas Geraes, Santa Catharina, Bahia, and in the island of Fernando de Noronha, where guano and phosphate of lime are also found. A number of States produce koalin of an excellent quality. Pure rock crystal is found in great abundance in the State of Goyaz.

The State of Minas Geraes (all kinds of mines) owes its name to the mineral wealth of its soil and to the importance of the mining resources contained within its limits. Among these, as already stated, gold occupies the first rank, mines of this metal formerly constituting the principal wealth of the State.

About the middle of the eighteenth century, in the year 1750, the greatest gold-mining movement took place in this province, when Ouro Preto was called Villa Rica, and contained more than 80,000 inhabitants. Since then the development of the gold mines has diminished, other branches of activity and industry claiming the attention of capitalists, fortune seekers, and speculators.

According to statistics[1] the gold production of the principal large mining companies, either in operation or which have been operated in Minas Geraes, is as follows:

	Kilograms.
"Gongo Soco" Mine and others of the English company "Imperial Brazilian Mining Association" (1824–1856)	13,200
"Morro Velho" Mine, of the English company "The Saint John del Ray Mining Company, Limited" (1830–1898)	65,000
"Catta Branca" Mine, of the English company "The Brazilian Company" (1832–1844)	1,181
"Morro de Santa Anna" Mine, of the English company "The Don Pedro Gold Mining Company, Limited" (1862–1878)	3,000
"Pary" Mine, of the English company "The Santa Barbara Gold Mining Company, Limited" (1862–1896)	3,000
"Passagem" and "Raposos" mines, of the English company "The Ouro Preto Gold Mines of Brazil, Limited"	4,000

To the preceding list other mines and mining enterprises having a production of about 1,000 kilograms each must be added. Gold

[1] Recueil Consulaire de Belgique, vol. 104, 1899, p. 320.

extracted by private parties, especially during the last century, rose to a much higher figure, which it would now be difficult to estimate.

As an illustration of the prospects of the mining industry in Brazil by modern methods, attention may be called to the São João del Rey Mining Company, an English concession, operating since 1834, but only lately equipped with modern appliances. It is stated in the last report of this company, for the month of October, 1900, that from 9,700 to 10,000 tons of quartz are crushed per month, or 120,000 tons per year, and that it is expected that very soon the proposed installation of new power will enable 150,000 tons or more to be worked per year. The yield per ton for the month was 7,448 *octaves* or 25 grams. The total yield for the month was 72,250 *octaves* of gold, worth £27,762 ($138,810). In the following month the production amounted to $36,000 from the 1st to the 10th, and $37,085 from the 11th to the 20th. This is equivalent to $5,000 per day, or $1,800,000 per annum. The miners work day and night, only stopping on St. John's Day. The expenses per ton, inclusive of taxes, fiscalization, etc., is about $3 at the present rate of exchange. It is now ascertained that this mine is far from being the richest or the most easily worked of the many mines existing in Minas and other States. It is the opinion of many experts that in the near future, when the digging of deep shafts is more generally practiced, there will be discovered in Brazil mines resembling the Transvaal treasures. For a long time the gathering of gold and diamonds from the banks and beds of rivers has been the occupation of thousands of people, this being their only mode of earning a living in some districts of the States of Minas, Goyaz, and Matto Grosso.

A recent source of mineral wealth has been found in the precious sands of Prado, State of Bahia. These sands are rich in monazite, from which thorium is extracted. An American, John Gordon, has obtained a concession for the exploitation of the sands, which he sells in Hamburg at an average of £45 per ton. The deposit is considerable, very easily worked, and near a safe harbor. A similar deposit was lately discovered in the State of Espirito Santo, south of Bahia.

More precious still than gold are diamonds, of which Brazil possesses many important mines of considerable value. Diamond mining is, however, more hazardous, more uncertain, and subject to greater risks than gold mining.

The famous diamond known as the "Southern Star," a magnificent stone of great purity, came from Brazil. It was discovered in the district of Bagagem by a negress in 1853. When found it weighed 254½ carats, which after cutting were reduced to 125½ carats. The syndicate which bought it resold it to the Indies for £80,000. Such a find was well calculated to stimulate the hopes of miners and explorers, and consequently the diamond-producing centers of Brazil, especially Diamantina, have for a long time been the headquarters of great activity.

Diamonds were first brought to notice in Brazil about the year 1727. Previous to this date the gold miners had found a few in the sand washings, without suspecting either their real nature or value.

The production is estimated, dating from the beginning of the industry, to amount to 12,000,000 carats (or 2½ tons of diamonds), representing about 500,000,000 *francs*. This production is distributed as follows:

	Carats.
Diamantina:	
1728 to 1772	2,000,000
1772 to 1843	2,000,000
1843 to the present time	1,500,000
Other mines in Minas Geraes	1,500,000
La Chapada (Bahia):	
1840 to 1850	1,000,000
1850 to the present time	1,500,000
Steals and frauds (estimated)	2,500,000
Total	12,000,000

In the last few years the production has considerably decreased, owing to the practical exhaustion of the superficial mines and to the competition of the African diamond mines, although they are much inferior to the Brazilian diamonds.

The discovery of the Cape mines and the great quantity of diamonds thrown upon the markets by these new deposits in the last twenty years have greatly affected this industry. It is acknowledged that the Cape diamonds are not worth as much as those from Diamantina, not being of the same brilliancy, purity, or water, but their abundance has somewhat cheapened this precious merchandise and diamond mining is now less remunerative.

In 1880 the production of Brazilian diamonds, coming almost exclusively from Minas Gereas, was valued at 5,000 carats. In 1883 this production fell to a few hundred carats and since then it has remained at a very low figure. This province has been the principal center for diamond mining in Brazil, which has also been carried on in Bahia on a small scale. The most important mines are, as stated, the Diamantina mines in the State of Minas, 800 kilometers from the coast and 311 kilometers from Ouro Preto, the former capital of Minas. The Grão-Mogol deposits to the northeast of the preceding mines and those of Bagagem and of Abaëté in the southwest have also been worked.

In the State of Bahia, where mining development is much more recent, the Cincoral and Salobro or Canavieiras mines may be mentioned.

The only small workings in existence in Minas are those of Poçâo do Moreiro, resumed in 1895 in the bed of the Jequitinhonha, and those of Ribeirão do Inferno, Guinda, Boa Vista, Dattas, Barro, Sopa, Caldeirão, Rio Pardo Pequeno, and Curralinho. In the Bagagem group is found the Agua Suja mine, where work was carried on from 1890 to 1892 and since 1895.

The diamond mines, which have been industrially worked, are almost always found in alluvial deposits. Some of them are deposits from rivers, or gravel (*cascalho*), in which diamonds and other hard minerals are embedded; others are deposits found on hillsides or on small lateral terrasses in the valleys, about 15 to 20 meters above the sea level, called *gupiaras*, and there are other deposits in the plateaus, formed by horizontal layers of coarse gravel mixed with red clay called *gorgulho*, and which often covers a diamond conglomerate called *tauá*.

In certain cases grottos, which were formerly invaded by water, have been found to be filled with *cascalho* of extraordinary richness. The walls of the grottos were found to be polished like marble, and when the first layer of sand was taken away the under soil was encrusted with precious stones. Some of these pockets yielded from 8,000 to 10,000 carats of diamonds.

Almost all the diamonds mined in Brazil have come from the *cascalho*, which presents many difficulties for its operation, as it is generally under water, it being necessary to first turn the course of the river during the dry season. As these rivers are deeply embedded, this demands the erection of very delicate works, which can only last for one season, as they are carried away when the rainy season begins. Hence the difficulty of organizing operations on a large scale for developing these deposits without considerable capital. The exploitation of the plateau deposits is made especially during the rainy season, when there is more water available for washing the ores. The diamond-bearing substance is usually submitted to three operations, the first being washing, when the rock is argillous; then placing it in a small square basin, where water is thrown with great force upon the gravel to detach the lighter parts, and lastly, to submit it to the vat treatment, which is more delicate and slower.

Among other precious stones found in Brazil, the topaz, emerald, amethyst, beryl, tourmaline, agate, and many others abound in Rio Grande do Sul, Minas Geraes, and other States.

While diamonds and gold have for a long time constituted the principal wealth of Minas, iron, which has been mined during the last ten years, seems to be destined to play an important rôle in the development of this State. Everywhere plants are being established, blasting furnaces erected, and even rolling mills are being built. The splendid and abundant iron mines of Minas are, generally speaking, still intact. Until 1888 no attempt was made to utilize the rich and inexhaustible iron deposits which abound in this State. In this year Messrs. Gerspacher & Amaro da Silveira established the first iron works and built the first blasting furnaces in Minas Geraes, at a place which they named Esperança, on the Central Railway of Brazil, near Itabira do Campo, where exist remarkable iron-ore mines. Soon other iron works were established—the Wiggs Works near Miguel Burnier, the União Works near Inficionado, and the

Monlevade Works near São Miguel de Piracicaba. The metallurgical industry seems to be entering upon a phase of development and prosperity. Unfortunately while Minas abounds in rich and excellent ores, two very essential factors—fuel and labor—are lacking. Fuel is very scarce and expensive and workmen are difficult to obtain.

These iron works, however, were of short duration, for one by one the smelters and blasting furnaces have closed down, until there is scarcely anything remaining of these enterprises. These attempts were not entirely lost, however, for at the same time the manganese deposits attracted attention and their development was begun.

The important rôle which manganese plays in the iron and steel industry gives to this ore, when rich and pure, an intrinsic value relatively high. In the last few years a number of plants have been established, principally near Queluz (Lafayette) and Miguel Burnier, along the Central Railway of Brazil. All the manganese ore is exported, the greater part being shipped to England. A Belgian company is said to have been formed for the development of the manganese ore deposits situated in Ouro Preto, the former capital of Minas.

Manganese has been found in the States of Matto Grosso, Santa Catharina, and São Paulo, but it is especially in the State of Minas that the finest and most important mines have been discovered, the industrial development of which has been undertaken in the last few years.

The manganese ores of Minas belong to the following mineralogical varieties: Pyrolusite (MnO_2), braunite (MN_2O_3), haussmannite (Mn_3O_4), acerdese or manganite (Mn_2O_3HO), psilomelane, and *wad*. This denomination of *wad* is the one given to the Queluz (Lafayette) ore and is the scientific name for an ore composed of hydrated manganese oxides. Of these ores the most abundant are manganite and pyrolusite, which are found in all the deposits, the first usually predominating. They are of excellent quality, contain a very high per cent of metallic manganese, and are very pure.

Phosphorus, which is one of the most detrimental impurities in manganese, is only found in very insignificant quantities in the Minas ores, some of which contain slight traces of sulphur, arsenic, nickel, zinc, and copper, but in too small a proportion to be prejudicial to the industrial value of the metal. The proportion of manganese oxides in these ores is from 70 to 75 per cent, corresponding to a yield of from 50 to 54 per cent of metallic manganese.

Manganese ores are found in small lodes in the mica and the argillaceous schists of Queluz, in pyrolusite veins in the Gandarella deposits, or in the form of stratified rocks in deposits of considerable importance owing to their extent and thickness. The deposits which are found in this form are not continuous; they are in lenticular layers, which have been found and observed in a zone extending for a dis-

tance of several kilometers along the Central Railroad between Lafayette, Ouro Preto, and Marianna.

These deposits situated along the railroad are the only ones upon which work has been begun, the principal centers of development being at Queluz and at Miguel Burnier, situated, respectively, at 462 and 496 kilometers from Rio de Janeiro. At Miguel Burnier one manganese mine is being worked by two companies, Airosa & Co. and Costa e Almeida. The Airosa Company also owns deposits at Queluz. The open-air method of working has been adopted in these two mines.

The ore is broken up without the use of explosives, simply by means of ordinary tools, after which it is transported to the stations along the railroad, either in ox carts or Decauville cars, this latter system usually being employed. The average cost of extracting the ore in the Airosa Company's mine is 15 milreis per ton.

Mercury, which is a necessary metal for the extraction of gold by amalgamation, has until now been imported from abroad. In the last few years, however, indications of a cinnabar (sulphide of mercury) mine have been found at Tripuhy, near Ouro Preto. This mine seems to have been formerly discovered by Eschwege, an eminent geologist. It has been thought that a certain geological analogy existed between this and the famous Almaden mine in Spain, which for a long time held a certain monopoly of the production of mercury. No attempt has yet been made for the industrial development of the Tripuhy mine.

Bismuth is found in the gold mine of Passagem, near Ouro Preto.

Silver, lead, copper, tin, and antimony exist and have been observed in different localities, but so far they have not given rise to any industrial development.

Marble is found principally at Gandarella, near Santo Antonio de Rio Acima, and at Antonio Pereira, near Ouro Preto. These marbles are very beautiful and are beginning to be quarried.

Limestone abounds in a number of places. One of the most important quarries in the State of Minas is at Carandahy on the Central Railroad. Raw material for the manufacture of tiles, bricks, crockery, china, etc., is abundant. A factory for the manufacture of these articles is established at Caëthé and another at Barbacena, both of which are giving satisfactory results.

Sulphur is an article of import which is quite extensively consumed in the State of Minas and throughout Brazil, being extensively employed in agriculture for destroying ants, the greatest enemy of the Brazilian farmer. Instead of importing the sulphur necessary to the preparation of bisulphide of carbon, the concentrated pyritic sands, which are the residuum from the gold sand washings of certain gold mines, could be utilized.

According to reports from the State of Bahia, an increase in the production of diamonds is noticeable there, not unlikely by reason of

the great heat and the consequent low-water level last year, in consequence of which large stretches of river beds were rendered accessible to exploitation. Amethysts are found in large quantities in the interior of the State, but by reason of their low price they are not sought after. Rubies, especially small ones and consequently suitable for the watch trade, are also found in large numbers, but business in them is poor, owing to the lack of demand.

Recent discoveries of minerals in Brazil are reported as follows: At Ouro Preto, copper, lead, graphite, mercury, and mica; at Tripuhy (Minas Geraes), mercury; in the valley of the Jordão (Minas Geraes), coal; at Juiz de Fóra (Minas Geraes), malachite, sulphur, saltpeter, and gold; at Caconde (Rio Pardo), gold, platinum, crystals, coal, and petroleum; at Prados, gold; at Agua Suja (Bagagem), diamonds; at Congonhas do Campo, lead, cobalt, antimony, and graphite; at Camaquan Pelotas, copper, nickel, agate, manganese, and mica.

The latest available statistics relating to two of the principal ports in the first six months of 1900 are as follows:

Auriferous sand	kilograms	800
Arsenicum	do	13,573
Crystals	do	21,506
Diamonds (value)	milreis	255,971
Coalin	kilograms	945
Manganese	tons	60,201
Metals (steel, iron, lead, zinc, etc.)	kilograms	5,103,668
Mica	do	4,198
Unspecified ores	do	500,560
Gold	grams	2,211,779,330
Stones (agate, etc.)	kilograms	1,337
Manufactured silver and gold (value)	milreis	29,307

Total value, in round figures, 4,700,000 milreis in gold, or about $2,500,000 in United States money.

In addition to its precious stones, minerals, and ores, Brazil possesses valuable mineral waters. Some of these mineral springs have medicinal and therapeutic properties, and the towns where they are found are gradually becoming important watering places. There are at the present time 14 different localities in the States possessing mineral springs endowed with medicinal and therapeutical properties, some of which are thermal waters. Among these, sulphurous, alkaline, ferruginous, and saline springs are found. Certain springs furnish very good table water.

The fourteen most important mineral springs are found in the following localities: Caxambú, Contendas, Lambary, Cambuquira, Poços de Caldas, Macacos, Rio Verde, Santas de São José, Nianna, Araxa, Desemboque, Salitre, Fervedouro, and Rio Pardinho.

Companies have been formed for opening up these watering places and running the baths and springs on the same plan as the European watering resorts.

Another large manganese deposit has been discovered near Ouro Preto, in the State of Minas Geraes. Analyses of samples taken from different parts of the vein by the "Escola de Minas de Ouro Preto" show an average of 49 per cent of metallic manganese, with no phosphorus and a very small percentage of iron. As the purest ore now exported from Brazil only averages 52 per cent of metallic manganese, the value of this new deposit can easily be comprehended.

According to the report of the directors of the São Benito Gold Estates, Limited, for the year ended June 30, 1900, 15,851 tons of ore were crushed, yielding gold to the value of £25,554, and the report of the directors of the Ouro Preto mine for the same period shows that the gold produced was valued at £89,823. The report of the São João del Rey Company shows that the sales of Morro Velho gold bullion for the first six months of the financial year amounted in value to £165,352.

The quantity of gold in bars shipped from Rio de Janeiro and Santos during the first three quarters of 1900 were, respectively, 972,264, 1,239,515, and 845,241 grams, a total of 3,057,020 grams, of 98,284.44 troy ounces.

CHAPTER IX.

INDUSTRIES AND MANUFACTURES.

There is no country in South America better endowed by nature with means for internal development than Brazil. The fertility of its soil, the wealth and variety of its mining regions, and the natural facilities afforded in certain States for water power would seem to make the country peculiarly adapted to the establishment of manufacturing industries on a large scale. Lack of means of communication, however, the distance between the centers of production and those of consumption, and the scarcity of population are the main obstacles to the proper development of this branch of progress.

In some States in Brazil the manufacturing industries seem to have made appreciable headway, and they are not exclusively in the hands of foreign companies or individuals. The principal national or domestic industries are cotton spinning and weaving, sugar refining, brewing, match, paper, and hat manufacturing.

Raw material is not wanting in Brazil; transportation facilities, capital, and efficient labor are the only requisites for the establishment of industrial enterprises.

There is a wide field for manufacturing industries in the State of Rio de Janeiro, and they will no doubt develop rapidly as soon as charcoal and coal are discarded for the production of power, and water is used for this purpose.[1] The State contains many streams that can be used for this purpose. The production of cotton goods takes a foremost place in the manufacturing industries of the State and is represented by a large number of important mills. Among these the *Fabrica de Fiação e Tecidos "Alliança"* (the Alliance Mills) is one of the most important. It was founded in 1880 by a private individual, with 80 looms. In 1886 it passed into the hands of a firm under the above name, which has developed it until now the works have 46,986 spindles, 1,248 looms, divided into 334 for ordinary cloth and 914 for fine cotton cloth, employing 1,625 operatives—men, women, and children—with a capital of 10,000.000 milreis. The output of the mills is estimated at about 14,000,000 meters of cotton cloth per annum. The power used is furnished by six steam engines, with 2,120 horsepower.

Another company is the "Companhia Brazileira Industrial," with a capital of 6,000.000 milreis and employing 857 operatives. There

[1] Recueil Consulaire de Belgique, vol. 104, p. 297.

is still another, called "Companhia Manufactora Fluminense," with a capital of 1,500.000 *milreis* and 360 operatives, its output during the summer of 1897 being 2,655,290 meters of colored goods and 2,933,484 meters white goods. There are other cotton mills, among which may be mentioned the Carioca, the Corcovado, the Confiança, the Industrial, and the Mineria companies, all of which seem to be doing well.

Respecting the national industries in the States of Rio de Janeiro and São Paulo, an English authority[1] states that the largest and most developed of the national industries in these States is cotton manufacturing. In this connection he says:

"Most of this cotton seems to come from Pernambuco. The majority of the mills buy in the market of Rio de Janeiro, but one of them at least buys from Pernambuco. * * * The cost of moving the cotton from the field to the mill in Rio, including the export duty, payable alike on cotton shipped to another State in Brazil as on that shipped abroad, is about 1d. per pound, or 0.70d. exclusive of the export duty. The high freight for coast transportation, resulting from the law which limits coastwise navigation to vessels of the national flag, tends to make this cost higher than it otherwise would be."

The spinning is all ring spinning and the highest counts of yarn spun are 50s to 60s. Almost all the hands employed in these mills are Brazilians or immigrants of different nationalities. According to the same authority, there is a mill in Rio de Janeiro which employs about 1,500 hands and has 355 carding machines, about 50,000 spindles, 1,250 looms (the majority being 36, 38, and 40 inches, with a few smaller sizes down to 30 inches, and some 48 inches), steam engines of a combined power amounting to nearly 2,000 horsepower, and an electric motor (United States) of 125 horsepower. Its chief product is bleached goods, but it also dyes and weaves trouserings, oxfords, etc., the total output being about 1,000,000 meters per month. The numbers of yarn used are 4, 6, 12, and 16 in the coarse-goods department and 30 and 40 in the fine-goods department. The wages, mostly based on the work done, are paid by the month, but not until the second Saturday of the following month. Advances are, however, given without interest, and the truck system is not adopted.

Another mill, also near Rio de Janeiro, has 12,000 spindles (all 38 inches), 318 looms, and a steam engine of 500 horsepower. It employs about 370 hands. Its chief product has been bleached goods, but one-color oxfords also have been made. Its total output is about 350,000 meters per month. This mill produces white shirtings of 80, 100, and 120 grams per meter, some with filling and some without, the latter only being made to order; also lawn (Cambray) of 80 grams, unfilled,

[1] Commercial Mission to South America. Mr. T. Worthington's Reports, pp. 114-121. Bul. No. 94, Bureau of the American Republics, 1899.

which is said to be very profitable. Wages, except those of weavers, are based on work done, but the management has ordered indicators, so as to put the weavers also on piecework. The supply of cotton being confined to the production of the country, owing to the duty on imported cotton and the Brazilian cotton being all long-stapled, both the above mills buy the poorest qualities for making low-grade goods.

A mill in São Paulo has about 170 looms, two engines of 240 horsepower combined, and a German motor for the electric light. It is said to employ about 400 hands. Its chief product is colored goods, viz, trouserings, oxfords, etc., but there are three or four wide looms for the production of gray goods of about 130 centimeters in width.

Another mill in São Paulo has about 22 carding machines, 4,500 spindles, 198 looms, and a 200-horsepower engine, all English, and German electric-light installation. About 350 hands are employed, and all are paid by piecework. The looms are 32 inches and 40 inches, and the product is almost entirely in checks and trouserings made from 8s and 10s yarn. The yarn is dyed on the premises, aniline dyes being principally used.

These São Paulo mills use some cotton grown in the State.

The authority referred to estimates that there are at least 11,000 looms, more or less, in the Rio and São Paulo districts, besides hosiery and undershirt machinery. A good deal of dying is done, but only one mill does printing.

There are print works in the São Paulo district which have over 800 rollers, and an amount of water power (some 1,500 to 2,000 horsepower) far beyond their requirements. From 130 to 150 hands are employed, and these are chiefly immigrants who understand the work, which is of a kind that the natives can not yet be trusted to do. They have machinery for printing in as many as eight colors, the machines being all of English make. The dyes (aniline) come from Germany and the alkalies from England. They print for others and also buy cloth and print for stock. Their charge for printing, including preparation of the cloth, which is delivered to them in the gray, is from 200 to 220 reis per meter for simple white grounds to 280 to 300 reis for a number of colors.

There are four jute-weaving factories in Brazil, having together about 1,100 looms. Three of these are in the Rio de Janeiro district, one of which makes a seamless bag under an American patent; but by far the most important of the four is the large factory in São Paulo. This factory contains 599 looms, which represent an annual capacity of 14,000,000 meters, and the looms are being added to in order to bring up the capacity to 18,000,000 meters. The staple product is the 37-inch "hessian" for the ordinary coffee bag, made in several different qualities, but the chief sale is of a quality weighing 290 grams per meter. Rather less than 1½ meters go to a bag. The factory will sell either bags or hessians. Thirty-inch hessians, 400

grams per meter, are also woven for the heavy bags for up-country use, as well as covers (varnished) for protecting coffee from rain-showers in the process of drying, and jute cloth for common scissor beds.

The factory has two English steam engines of 300 and 100 horse-power, respectively; its own water supply, brought from a stream 4 miles distant; a large condensing tank and a railway siding, and it employs about 900 operatives. From December to May there is but little sale for the hessians, so they have largely to go into stock during that period, and new depositories are being built to facilitate this.

The making of common cordage and twine, largely from "sunn" hemp, is an industry which is carried on in a number of small rope-works; but seaming twine for the coffee bags, made of Italian tow or hemp, is made in at least two well-appointed factories, one in Rio and one in São Paulo.

The former was only reopened last year, after having been closed for a number of years, and it appears to be under capable and active management. The machinery used is mostly English, the engine being of 80 horsepower, and there are about 1,500 spindles. About 140 operatives are employed at present. The output amounts to 1,500 kilograms daily. More than half of this is seaming twine, and some 250 kilograms is good quality parcel string, making a total of over 1,000 kilograms daily from yarn spun in the factory. The balance of 1,500 kilograms is made from finer yarn imported from Italy, the factory not having the necessary machinery for spinning this finer yarn. Cordage and rope from Italian hemp are also made here, but the machinery is being reset. There is a dyehouse attached for dyeing string, and also a storehouse.

The factory at São Paulo is situated close to the railway and is quite new. Its machinery, including a 100-horsepower engine and a small engine for use in case of need is all British. At present there are only 200 twisting and 200 spinning looms. The output is about 500 kilograms daily, all being twine made from Italian hemp costing about 45 to 50 lire per 100 kilograms. Nearly all this twine is 2-ply, although a little 3-ply is also made. The price, indifferently, is 2.8 milreis per kilogram. About 40 hands are employed.

As regards woolen manufacture, the principal mills are the *Fabrica do Rinck*, in Rio, which has been in existence for nearly twenty years. This company in 1897 had 70 looms and the necessary machinery for dyeing, felting, spinning, etc. The raw material used is imported from Cape of Good Hope and a small portion from Rio Grande do Sul. The products of these looms embrace cloths, flannels, felts, dress and upholstery stuffs, counterpanes, rugs, etc., and it turns out about 20,000 meters of textile per month. There is in Maranhão a wool-weaving factory, which produces well-finished flannels, coatings, and diagonal cloths. At Nictheroy there is the *Fabrica Aurora* (Aurora

Mills), with 12 looms, which uses imported yarn, its product being chiefly good coatings. The Companhia de Fiação e Tecidos, of Porto Alegre, has a capital of 2,400,000 *milreis*. It has 132 machines at work, with 200 horsepower, and gives employment to 363 operatives, men, women, and children, the average output of the mill being 360,000 kilograms of yarn per annum. Their output consists chiefly of shawls, rugs, capes, cheviots, diagonals, coatings and blue cloths, counterpanes, house rugs, table covers, some of the articles being of pure wool and others in wool and cotton mixed. At Rio Grande do Sul City there is a factory called "Rheingantz," from the name of its founder, a Brazilian citizen, which works chiefly with wool from the State of Rio Grande and the River Plate, its productions consisting in flannels, rugs, bedcovers, cloths, baizes, etc. A new mill has come into existence through the enterprise of the wealthy owner of the large Hessian factory in Sao Paulo, alongside of which factory it is being constructed, and whose water supply it uses. The machinery, including the engine of 300 horsepower, is all English, and an English electric-light plant is being procured. There are only 80 looms at present, and only a portion of these are working, but more are soon to be added. Worsted yarns, as well as some woolen yarns, are imported, also a little mixed wool and cotton, all from England. The chief product is high-quality stuff for both men's and women's wear, some dyed in the piece at the mill and some made from the yarn imported dyed. A little flannel is also made. Common blankets with cotton one way were tried, but did not prove a success.

One of the leading felt-hat factories is situated in the neighborhood of Rio de Janeiro. The machinery, including a 50-horsepower engine and boiler and British electric-light installation, is largely British, but there are also some American and other machines. The hair-felt making machines work open—i. e., without a glass cover. At present about 100 operatives are employed, and the output amounts to about 400 hats per day, half being made of felt and half of wool, perhaps 10 per cent of the total being hard hats. Except a little native "castor," the hair is mostly imported fur, while the wool is nearly, if not all, imported from or through England, the native wool from the south not being considered good enough for the work of this factory. The lowest quality hats (wool) produced sell at about 1.5 *milreis* each, wholesale, while average good quality woolen hats, the article the factory sells more than any other, are sold at 4.5 *milreis* each and average good soft felt hats at 9 *milreis* each. Nineteen hat factories paid the internal duty in Rio de Janeiro alone in 1900. There are also important ones in other States, especially in Rio Grande do Sul and São Paulo.

There are 18 foundries in Rio. The most important of the iron-works in Brazil is the National Rolling Mills, situated in the vicinity of Rio de Janeiro. They have a harbor front and a railway siding.

The output of bar iron is estimated at about 250 tons per month. The combined power of the works amounts to 250 horsepower, supplied entirely by English steam engines. The electric plant used in connection with the works is American. A large foundry is attached where a variety of work is done, such as hand pumps (American pattern), trolley wheels, street-car wheels, boxes, etc. These works are also provided with machinery for the manufacture of wood screws, hinges, locks, and wrought-iron enameled hollow ware. They employ about 400 operatives.

There is another foundry which makes chiefly box-smoothing irons for use with charcoal, turning out about 500 finished per day. These smoothing irons are cast four at a time by a patent used only in Brazil. They weigh about 2½ kilograms each, are packed 1 dozen in a box for shipment, and sell at 36 *milreis* per dozen. The handles are made of native wood turned on the premises. This foundry also makes cast-iron pots, cast-iron fire holders for cooking, cast-iron spirit burners (also for cooking), cast-iron tops for brick cooking ranges, and tailors' smoothing irons weighing 4 or 5 kilograms each. The spirit burners, which are much less used than the old-fashioned fire holders, are sold at only 10 *milreis* per dozen in large quantities. There is a carpenters' shop attached to this foundry where wheelbarrows on the American pattern are made from native wood (steamed and bent on the premises), also collapsible stools of deal laths to sell at 30 *milreis* per dozen, etc. The machinery in this factory is all English, including one cupola and two small steam engines. There are about 86 operatives, all of whom are on piecework. The smelters' clay, as in all these foundries, either comes from Lisbon, or is mainly composed of Lisbon clay.

There are in Rio 4 nail factories. The Rio Wire Nail Factory has 40 machines (German), a French engine of 100 horsepower, and Babcock & Wilcox boilers (2). It employs about 60 operatives, and its production is about 5,000 to 6,000 kilograms daily. The capacity of the factory is stated at 10,000 kilograms daily. The wire is all imported from Germany, the nails being made direct from the wire as imported and finished in revolving drums with sawdust and grease. The nails are put up in paper packets (paper from local factory) of 2 kilograms each, and when packed for shipment by sea or overland 25 to 50 of these packets go in a wooden case made on the premises from imported deal.

Another local industry is the making of horseshoes. The principal factory employs 36 hands and turns out 500 to 600 dozen shoes per day. The only machinery in use is an English engine, a machine for stamping and bending, another for cutting, and another for punching.

Perhaps the most important industry of this kind is the making of machinery, especially coffee machinery, in the Sao Paulo district. There are eight factories engaged in this business, three of which also import machinery. One of the principal of these factories has two

establishments, one in the business part of the town and a newer one outside with a railway siding. In the latter there is a large foundry, and between the two about 550 hands are employed. Coffee machinery is the principal product of these works, and water motors are said to be the next most important item of manufacture. The gross output is over 500 tons per month. It is estimated that more wrought than cast iron is used. For the woodwork in the coffee machinery "peroba," the well-known native wood, is used.

Glass blowing is carried on at two factories in Rio and at two in São Paulo. The one in Rio is worked by the owner and his two sons with Brazilian operatives, of whom about 300 are employed. There are two large and two or three small furnaces. The machinery, including a small steam engine, is all French. The factory has water frontage on the harbor. The value of the annual output is estimated at about 1,100,000 *milreis*, the largest product being common tumblers and lamp chimneys, but a variety of other articles is also made, such as common decanters, cheese covers, vases, and lamp bodies (some opaque and colored, looking like porcelain), salt cellars, etc. The sand comes from a place on the coast which belongs to the owner of the factory; none is imported. It is believed that many of these products, which are shipped up the coast, are sold as imported from Europe.

The larger of the two São Paulo factories is comparatively new. It has a siding on the railway. There is one large furnace with five openings. Some of the machinery was made in the country, the remainder being French. The workmen—about 90—are chiefly French and Italian, who were brought over for this purpose; but Brazilian youth are learning the work. The product is hard glass bottles for Pasteurized beer, which is made by both the two large breweries in the country, and it amounts to 18,000 bottles per day, 6,000 being made during each shift of eight hours. The raw materials used are sulphate of soda from Marseilles, local flint or slate stone roasted and powdered on the premises, and local yellow (with some brown) sand, no coloring material being used. The factory is on the edge of a large expanse of marshy land, where, after digging a couple of meters of peat (good for fuel), they get their sand.

The only earthenware made in the country appears to be the common stuff of red clay, of which there are several factories throughout the country. One factory is situated in Rio de Janeiro, and has three ovens, all on the down-draft system. A week intervenes between one filling of an oven and the next. There is a small French engine to work the mixers or crushers, and about 70 operatives are employed. The output is valued at 300,000 *milreis* per annum, and all is sold locally. The articles produced comprise water jugs, filters, flowerpots, etc.

The making of safety matches, practically the only ones used in the

country, is an important industry. The matches are packed in boxes made from terne plates. The largest factory, which is allied with the great company in England and America, is said to be under excellent management, and to contain excellent American labor-saving machinery. The output of this factory some time since was 630 tins per day, while only 50 operatives—some of them Americans—were employed, exclusive of the men in the repair shop. The factory which produces the best matches, however, imports everything—boxes, sticks, etc.—so that there is little more to do than to put the igniting composition on the sticks and then pack the matches in the boxes. This factory, which contains German machinery, was only producing 130 tins per day at the time when the large factory was turning out 630.

The making of stearin candles and of soap is carried on in a large, long-established, and well-managed factory in Rio de Janeiro. There are besides 34 other factories. In São Paulo there is a comparatively new factory, small, but well arranged. The machinery in this factory is German and French, and includes a German steam engine of 50 horsepower. Forty to fifty operatives are usually employed. The productive capacity of the factory is about 5,000 boxes of candles per month. Each box weighs 10 kilograms and contains 25 packages. Some of the packages contain 4, some 5, and some 6 candles, but the weight of each package is identical. Twenty-five thousand to 30,000 boxes of common soap are also made monthly. Each box contains 27 pieces, but the pieces are of four different sizes, and the weight of a box varies from 3 to nearly 9 kilograms.

Glycerine is also produced. This article finds a small local market, but the bulk of it is exported.

The price of the candles is about 17 to 18 *milreis* a box. The price of soap is from 1.0 *milreis* per box of 3 kilograms to 5.6 or 5.8 *milreis* per box of 8.50 kilograms. Most of the tallow used comes from the river Plate and Rio Grande do Sul.

Other manufacturing industries may be mentioned, such as breweries, flour mills, tanneries, boot and shoe manufactories, brick and tile factories, factories of biscuits or crackers, sugar, paper, carriages, chemical products, etc. According to the report of the minister of finance, the total number of industrial concerns that paid duties in 1900 in the federal capital alone was 635.

CHAPTER X.

COMMERCE.

Until 1808, Brazil, being under colonial régime, carried on a direct trade with Portugal only.[1] In the eighteenth century, during the course of the war with Holland, the custom was established of sending a fleet of merchant vessels to Rio and Bahia, convoyed by men-of-war. In 1649 a powerful company was formed in Lisbon, known as the "Companhia Geral do Commercio do Brazil," which in after years changed its corporate name to Junta do Commercio. This company possessed vast privileges, had a large number of armed vessels, and supported a regiment of marines and naval batteries. Every year expeditions were sent out from either Lisbon or Oporto to Recife, Bahia, and Rio, returning to Portugal with cargoes of gold, diamonds, sugar, hides, tobacco, and other products of the colonies. The merchants of Rio and Bahia protested against this monopoly and, in 1720, succeeded in having the company suppressed, but the usage of having merchant fleets convoyed by men-of-war was continued until 1765.

Brazilian exports, during the eighteenth century and the early part of the nineteenth, consisted mainly of gold, diamonds, sugar, cotton, cacao, tobacco, hides, timber, and dyewoods. In 1800, according to official data,[2] export values amounted to 18,000,000 *pesos*, while imports reached 10,000,000, a total of 28,000,000 pesos. In 1808, upon the arrival of the royal family, the ports of the country were opened to foreign commerce in general, which continued to be of small value until 1825, when the exports of coffee assumed considerable importance. During the period of agitation and civil war, ended in 1848, commerce attained a certain development in the provinces of Rio de Janeiro, São Paulo, and Minas. The pressing demand for cotton from 1864 to 1869 and since 1870, the rapid development of coffee culture, and the establishment of railway lines have caused steady commercial advancement. From 1861–62 the value of exports has always been in excess of import values.

The foreign commerce of Brazil is carried on principally with the

[1] Levasseur: Le Brésil et Rio Branco. Paris, 1889, page 75.

[2] Opus cit., ibid.

United States, Great Britain, France, and Germany. In 1806 the import and export trade of Brazil amounted to 22,600 contos. From 1833 to 1840 it averaged 84,000 contos a year. From 1850 to 1855 the average exceeded 108,000 contos; in 1860 it amounted to nearly 223,000 contos. The average from 1875 to 1880 was 368,621 contos; from 1888 to 1890 it was 416,292 contos; and in 1890 it reached 578,000 contos. The conto is worth $546.

The Government of Brazil is only now publishing regular statistics of its foreign trade, but the following figures are considered to be a fair estimate of the imports and exports of that country for the six years 1893–1899 and 1900:

Year.	Imports (sterling).	Exports (sterling).
1893	£17,798,570	£32,827,826
1894	15,653,886	27,547,944
1895	15,420,292	29,015,000
1896	17,023,012	26,027,137
1897	21,567,660	26,752,224
1898	24,486,000	27,442,450
1900 (estimated)	----------	34,000,000

The principal articles of export are coffee, rubber, tobacco, hides and skins, cacao, mate, sugar, precious metals, and cotton. The principal imports are textile fabrics, iron, hardware and machinery, coal, flour, oils, manufactures of leather, lard, wood, and its manufactures, provisions, etc.

Brazil imports principally from Europe. Its exports to the United States average $60,000,000, while its imports from the United States average $11,000,000 annually. The principal countries of Europe from which Brazil receives its imports are Great Britain, France, Germany, Italy, and Portugal. Brazil, in 1897, occupied the third place in the list of countries exporting to the United States—the total value of her exports, in 1896–97, to that country being about $69,000,000 gold, of which $52,792,937 were for coffee, estimated at 542,857,265 pounds.

The official value of coffee exported from Brazil during 1897 was £16,973,000. The following list shows the official value of the other chief exports during the same period:

Rubber	£4,989,711
Tobacco	799,061
Hides and skins	447,574
Cacao	425,265
Maté	320,700
Sugar	236,193
Precious metals	236,158
Cotton	182,613
Brazil nuts	71,796
Piassava	36,622

The importance of the coffee trade is shown by the subjoined table of exports in 1896–97 from Rio and Santos, the ports through which the whole trade is practically carried on:

Exports to:	Bags of 120 pounds.
Germany	2,058,333
France	1,146,166
Austria	680,833
Great Britain	206,333
Belgium	380,500
Switzerland	153,500
Total to Europe	4,625,665
North America	4,658,816
Total	9,284,481

The value of the above trade has been estimated at 360,000,000 milreis, but the value of this article has proved to be so changeable that no rule can be established for it. It has oscillated during the last decade between a little more than £1 and £4 per bag of 60 kilograms.

A commercial publication from Rio de Janeiro[1] gives a tabulated statement showing the quantity and value of coffee exported during the crop years 1897–98, 1898–99, and 1899–1900, from which the following data are extracted:

	Quantity.[2]	Value.
Rio de Janeiro:		
1897–98	4,247,785	£6,814,545
1898–99	3,192,396	4,939,122
1899–1900	3,294,987	5,473,335
Santos:		
1897–98	6,072,349	10,369,602
1898–99	5,537,851	8,950,530
1899–1900	5,678,838	9,066,266

making a total of 10,320,134 bags, valued at £17,184,147 for 1897–98; 8,730,247 bags, at £13,889,652, for 1898–99; and 8,973,825 bags, at £14,539,601, for 1899–1900.

The coffee shipped, according to manifests, during the crop 1899–1900, is given by the same publication as 9,702,471 bags, against 9,547,855 for 1898–99, the largest shipments in 1899–1900 being as follows: New York, 3,849,412; Hamburg, 1,524,309; Havre, 921,556; Rotterdam, 710,451; Trieste, 551,410; Antwerp, 336,737; Baltimore, 274,058, and New Orleans, 213,063.

During the same years the sales of coffee were as follows:

Year.	Rio de Janeiro.	Santos.	Total.
	Bags.	*Bags.*	*Bags.*
1898–99	3,584,200	5,322,000	8,414,500
1899–1900	3,233,000	4,819,000	8,052,000

[1] The Brazilian Review, vol. 3, No. 31, July, 1900.

[2] Bags of 60 kilograms.

which compared with the respective shipments show a difference of 315,747 bags in 1898–99, and of 921,852 in 1899–1900 previous stock in hand. The production of coffee in the world, Brazil included, being about 13,000,000 bags, it is easy to realize the prominent part played by Brazil in this important commerce. This immense production is not to be ascribed to the extent of land under cultivation, which is comparatively small; it is the excellency of that land that affords such a wonderful yield. On an average, each coffee tree in Brazil produces twice that of any other country.

Rubber is the second leading article of export of Brazil. During the fiscal years of 1897–98 and 1898–99 the entries of rubber to Pará were, according to Brazilian statistics, as follows: 1897–98, 22,257 English tons against 25,374 tons in 1899–1900, while the shipments were:

	1898-99.	1897-98.
	Tons.	*Tons.*
United States	12,398	11,422
Europe	12,848	10,796
Total	25,246	22,218

The total exports of rubber from Pará from 1890–91 to 1898–99 have been estimated thus:

Year.	United States.	Europe.	Total.
1890-91	9,462	6,995	16,457
1891-92	11,593	7,168	18,761
1892-93	11,768	7,071	18,839
1893-94	10,626	9,205	19,831
1894-95	11,057	8,514	19,571
1895-96	9,968	11,116	21,084
1896-97	9,848	12,368	22,216
1897-98	11,422	10,796	22,218
1898-99	12,398	12,848	25,246

Brazil is not only by far the greatest producer of india rubber, but its product is considered the best. For certain special works Pará rubber can not be replaced by any other. There have been several attempts to cultivate the Pará rubber tree in Africa, India, Ceylon, etc., with the result that it degenerates and gives an inferior product when grown elsewhere than in its native country. So the best india rubber may be considered a privilege of Brazil, not only in the States of Pará and Amazons, but also in Matto-Grosso and Goyaz. The average price of Pará rubber is above $1 per pound.

The exports of cacao and Brazil nuts for ten years have been as follows:

	Cacao.	Nuts.		Total.
		America.	Europe.	
	Tons.	*Bushels.*	*Bushels.*	*Bushels.*
1898	2,663	174,002	181,687	355,689
1897	3,765	145,229	166,260	311,489
1896	3,328	189,829	207,331	397,160
1895	5,225	100,088	174,390	274,478
1894	3,591	296,725	317,262	613,987
1893	4,984	125,878	105,243	231,121
1892	4,402	176,385	121,256	297,641
1891	6,555	338,579	351,042	689,621
1890	3,385	33,641	61,614	95,255
1889	4,487	90,632	192,323	282,955

The exports of tobacco through Brazilian ports for the year 1899 are given as follows:

	Kilograms.
Maranhão	42,944
Ceará	85,260
Rio Grande do Norte	4,120
Bahia	13,776,788
Espirito Santo	770,000
Rio de Janeiro	116,900
São Paulo	2,409
Santa Catharina	104,524
Minas (estimated production)	3,500,000
Pará (estimated production)	800,000
Total	19,202,945

For the first six months of 1900, the exports from Bahia alone amounted to about $5,000,000. The exports of tobacco through the port of Bahia in 1897 were estimated at 56,061,338 pounds, and at 64,153,607 pounds in 1898.

"The fact that Brazil," says an authority,[1] "sells a very large proportion of its coffee and rubber to the United States gives to this country a somewhat larger percentage in her imports than in those of many other of the South American countries. The exports from the United States to Brazil, which, in 1888, were $8,127,883 in value, in 1898 were $13,317,036. The imports into Brazil from the United Kingdom are, however, much greater than those from the United States, having been in 1897 $27,721,024, against $31,951,789 in 1888. From France the imports are also larger than from the United States, being in 1897 $16,917,622 and in 1888 $15,453,898. From Germany the imports of 1897 were $12,489,526, against $5,247,900 in 1888. It is thus apparent that while the United States has gained more rapidly in exports to Brazil than have the United Kingdom or France, her share in the commerce is smaller than that of either of those coun-

[1]American Commerce; Summary of Commerce and Finance, June, 1899. Treasury Department, Washington.

tries, and that Germany has made a larger increase than the United States. * * *

"From the United States the principal exports to Brazil are manufactures of iron and steel, furniture, cotton goods, mineral oils, breadstuffs, and provisions. From the United Kingdom, which furnishes the largest share of Brazil's foreign purchases, the importations of cotton goods in 1897 were $8,700,000; wrought and unwrought iron, $2,900,000; woolen manufactures, $800,000; coal, $2,900,000; and machinery, $1,600,000.

"Published statements regarding the commerce of Brazil are frequently misleading, because of the somewhat uncertain and confusing value of the currency of that country. The total value of the imports in 1897 is given at 671,603,280 *milreis* and the exports at 831,806,918 *milreis*. As the nominal value of the *milreis* is 54.6 cents gold, this indicates on the surface an enormous commerce. The facts seem to be, however, that the actual currency is a paper *milreis*, of which very large sums have been put into circulation, the total at the end of 1896, according to the Statesman's Year-Book, being 712,355,394 *milreis*, an average of about 50 *milreis*, or over $27 per capita, had the paper remained at par. The gold and silver coins have, however, almost entirely disappeared, and while according to the Statesman's Year-Book the present nominal exchange rate of 2s. 2½d. was established in 1846, 'the actual value of the paper *milreis* fell in 1868 as low as 1s. 2d.; in 1891 it touched 1s. 0½d.; in 1893, average 12d.; in 1894, average 10½d.; in 1895, 10¼d.; in 1896, between 8d. and 10d.; in 1897, between 7d. and 9d.; in 1898 it fell as low as 5¾d., but on July 31, 1898, it had recovered to 7¼d.' On February 25, 1899, however, United States Consul-General Seeger, in a report to the State Department, says: 'I am obliged to add a very unpleasant postscript to my report. During the last two weeks the Brazilian currency has again steadily decreased, and the quotation has fallen from 7$\frac{5}{16}$d. to 6$\frac{7}{8}$d., the quotation of to-day.'

"The Statesman's Year-Book for 1899, estimating the value of the commerce of Brazil, which is stated in the depreciated *milreis*, says 'The total value of exports from Brazil for the year 1897 is given, exclusive of specie, at 831,806,918 *milreis* = £26,752,224, at 7$\frac{13}{32}$d. to the *milreis*; and the imports at 671,603,280 *milreis* = £21,567,660.'

"Hazell's Annual puts the value of the exports of 1897 at £24,500,000. United States Consul-General Seeger's report, in Commercial Relations for 1898, states that the exchange value of the *milreis* in sight drafts on New York ranged from 7.46 *milreis* per dollar (13.4 cents per *milreis*) in January, 1898, to 6.10 *milreis* per dollar (16.4 cents per *milreis*) in September, but his dispatch of February 25, 1899, above alluded to, indicates that it was on that date 6.48 *milreis* per dollar, or about 15.4 cents per *milreis*.

"From these statements it would appear that the real value of the

imports of Brazil in 1897 was about $105,000,000 and the exports about $130,000,000."

The present rate of Brazilian exchange (January 21, 1901) is 10⅛d. per *milreis*, equivalent to 20.4 cents.

The value of trade of the United States, the United Kingdom, France, Germany, and Spain with Brazil since 1890 is given in the subjoined table:[1]

Years.	United States.		United Kingdom.		France.	
	Imports into, from Brazil.	Exports from, to Brazil.	Imports into, from Brazil.	Exports from, to Brazil.	Imports into, from Brazil.	Exports from, to Brazil.
1890	$59,318,756	$11,972,214	$21,172,560	$37,934,723	$24,315,788	$18,872,490
1891	83,230,595	14,120,246	20,682,182	41,877,658	25,006,021	23,423,970
1892	118,633,604	14,291,873	17,090,861	39,993,140	30,767,097	18,117,014
1893	76,222,138	12,388,124	22,561,590	39,261,793	24,913,062	20,956,431
1894	79,360,159	13,866,006	19,174,346	38,087,983	17,373,057	23,805,858
1895	78,831,476	15,165,079	17,588,285	37,198,256	32,178,428	23,241,859
1896	71,060,046	14,258,187	19,727,151	33,982,993	24,491,087	20,953,857
1897	69,039,389	12,441,065	18,183,283	27,721,024	27,946,383	16,917,622
1898	61,750,369	13,317,036	----------	----------	----------	----------
1899	57,875,747	12,239,036	----------	----------	----------	----------

Years.	Germany.		Spain.	
	Imports into, from Brazil.	Exports from, to Brazil.	Imports into, from Brazil.	Exports from, to Brazil.
1890	$38,227,560	$13,719,986	$22,156	$99,129
1891	45,160,024	14,500,388	216	85,344
1892	35,670,012	13,514,592	661	70,147
1893	35,895,398	16,171,862	1,394	62,653
1894	23,560,572	15,128,708	3,607	823,733
1895	32,715,718	19,198,270	32,807	706,927
1896	27,930,490	15,715,616	2,052	561,417
1897	28,909,860	12,489,526	----------	----------

In this table the years end as follows: United States on June 30; United Kingdom, France, and Spain on December 31, and Germany on March 31.

The special commissioner sent by the British Board of Trade to study the conditions of British trade in certain South American countries[2] says:

"The import trade is in many hands. A large, and I am disposed to think increasing, proportion of it is done direct by means of travelers, or local representatives, between European shipping houses (or manufacturers) and native dealers. Some idea of the importance of the business done in this manner may be had from considering that the total of European (and American) collections by drafts through Rio alone, based on figures I have obtained from the five leading non-

[1] Summary of Commerce and Finance for June, 1899, Bureau of Statistics, Treasury Department, Washington.

[2] Reports from Mr. T. Worthington, etc. (Reprint), Bulletin No. 94, Bureau of American Republics, Washington, 1899, p. 94.

Brazilian banks, must have amounted to something like £2,500,000 to £3,000,000 last year, while a very large sum must be added to represent the business done in account current—that is, where the buyers are allowed to remit more or less as they are able. As already intimated, there is no means of getting at the exact value of imports into Rio and Santos, but they are estimated approximately at £10,000,000 to £12,000,000, which may serve as a basis in considering the foregoing. A large amount of hardware and miscellaneous business is done by merchants here (who have houses in Europe) getting orders and importing for account of orderers. Indeed, so far as regards British merchants, there seems to be very little own-account business, except in the dry-goods trade."

The usual credit given by European merchants in the dry goods trade is from four to six months, counting from the end of the first month, and in the hardware trade ninety days from the end of month. In current accounts direct credits are very elastic, the custom being to sell on a basis of cash in ninety days from arrival of goods from Europe, and from thirty to sixty days for American shipments. National factories sell generally at ninety days.

The report above quoted gives a list of the principal foreign products imported into Brazil, from which it appears that firearms are imported as follows: Revolvers from the United States and Belgium, although there are in the market several cheap imitations; double-barreled pistols and shotguns from Belgium, the finest grades of the latter coming from England.

Notwithstanding the number of Brazilian breweries operated either on the German or the American plan, which practically supply the demand, some special brands are imported, although these imports seem to be steadily decreasing. The number of cases of beer imported into Rio in 1895 amounted to 54,263, against 7,270 in 1896 and 3,045 in 1898.

Bar iron comes mostly from Great Britain, but manufacturers in the United States are attempting to obtain a portion of this trade. Belgium and Germany furnish a considerable amount of iron. In railway material of all kinds, springs, wheels, axles, and brakes, the competition is chiefly between Belgian and British manufacturers. Galvanized sheet iron formerly came entirely from Great Britain, but now much of it, which is used for coffee machines, is imported from Belgium. Tinned sheet iron is used in the district of São Paulo for gutters, etc. In bridge construction the Belgians are the most important competitors. Wrought-iron pipes, black and galvanized, are imported from the United States. The large cast-iron pipes for the waterworks in Santos have also been obtained from the United States.

The principal articles of American manufacture imported into

Brazil during the twelve months ending June, 1898, 1899, and 1900, were the following:

Articles.	1898.	1899.	1900.
Agricultural implements	$24,775	$34,130	$32,121
Books, maps, etc	153,770	45,536	66,972
Flour	3,240,362	3,399,027	2,549,065
Carriages, cars, and other vehicles	564,773	105,583	163,657
Cycles and parts of	98,482	55,046	30,812
Clocks and watches	40,898	67,745	65,698
Coal	93,778	155,354	128,977
Cotton, manufactures of (cloth)	565,921	545,545	394,114
Other manufactures	50,828	41,657	42,004
Fruits and nuts	11,843	17,206	20,163
Instruments and apparatus of all kinds	88,283	113,781	222,137
Hardware	160,884	225,191	206,746
Sewing machines	95,966	112,398	135,522
Typewriting machines	4,945	6,135	11,719
Leather, manufactures of	54,022	53,913	107,231
Naval stores	194,409	220,213	145,670
Turpentine, spirits of	74,148	51,791	78,260
Oil, mineral, refined or manufactured	1,582,231	1,499,118	2,027,496
Oil, cotton seed	237,065	196,501	284,936
Paraffin and paraffin wax	10,968	13,583	16,152
Canned beef	17,744	17,101	31,946
Tallow	25,070	37,778	62,478
Bacon and hams	511,433	419,394	140,801
Lard	973,990	1,209,882	830,321
Butter and cheese	92,448	178,152	189,976
Furniture	36,010	32,819	38,339
Timber and lumber	687,074	448,146	384,091

The total imports from Brazil into the United States during the same period were $61,750,369 for 1898, $57,875,747 for 1899, and $58,037,457 for 1900, while the exports to Brazil amounted to $13,317,036, $12,239,036, and $11,578,119, respectively.

The principal exports from Brazil to the United States during the same period were, in detail, as follows:

Articles.	1898.	1899.	1900.
Cacao	$173,846	$646,756	$994,283
Coffee	40,956,963	35,253,834	34,333,782
Rubber, crude	14,980,875	16,999,345	17,954,490
Precious stones	1,303	.....	3,363
Sugar, molasses, etc	2,317,987	810,276	1,693,588

A Belgian consular report[1] states that during 1897 the imports of flour into Rio de Janeiro amounted to 336,533 barrels of 90 kilograms each, as follows: United States, 252,991; Rio de la Plata, 65,697; Liverpool, 9,850; Fiume, 4,395; and Chile, 3,500 barrels. In the year 1893 said imports were 541,749 barrels, 603,329 in 1894, 341,609 in 1895, and 375,935 in 1896. The same authority states that a milling company at the same place imported during 1897, 52,450 tons of wheat, the share of the United States being 17,950 tons and 34,500 that of Argentina, while another company imported 3,664 tons from the United States and 22,680 from Argentina, or a total of 26,344 tons, the grand total being 78,794 tons. The aggregate product of flour of

[1] Recueil Consulaire, vol. 101, 1898, p. 339. Bruxelles.

both companies amounted to 584,707 bags of 90 kilograms. The imports of rice during the same period were 1,237,277 bags, 134,359 from Europe and the balance from India. The introduction of dried beef in the same period rose to 51,456,620 kilograms, divided into 24,749,010 from Argentina, 25,492,550 from Uruguay, and 1,215,060 from Rio Grande do Sul. The kerosene oil consumed in Rio is exclusively American, as well as the turpentine imported. The statistics of imports of said goods, as given by the quoted report for the year under consideration, amounted to 475,767 cases of kerosene and 7,914 cases of turpentine.

The same authority[1] gives the following data in reference to the commerce of São Paulo: The custom-house at said port has estimated the trade of that State for 1897 at about 450,000 *contos*[2] *de reis*. Adding to these figures 25,000 *contos*, the product of coastwise and interior trade, the total will be 475,000 *contos*, of which 175,000 are for imports and 300,000 for exports. Investigations conducted by the authority in reference show that the percentage by countries in said trade is as follows:

Country.	Imports.	Exports.
	Per cent.	*Per cent.*
England	25	2
Germany	24	25
Belgium	5	8
Austria	3	9
France	7	14
Italy	8	3
Argentina and Uruguay	8	
Portugal	5	9
Netherlands, Denmark, and Spain	7	
United States	8	30

The only export of this port is coffee.

The trade of Rio Grande do Sul, through its principal port, Rio Grande, amounted for 1897 to 15,916$587 *reis* for imports, as follows:

	Reis.
Germany	8,468$000
England	1,609$000
France	259$400
Belgium	114$292
Argentina	1,170$114
Uruguay	1,231$706
United States	882$417
Spain	1,050$553
Italy	586$444
Portugal	572$805

The value of the exports for the same year amounted to 40,873$160 *reis*.

[1] Vol. 104, 1899, pp. 274, 338.

[2] One *conto*, or 1,000,000 *reis*, or 1,000 *milreis*, is indicated as follows: 1:000$000.

The following table, prepared from official data, shows the exports of Bahia for 1897–98, and from January to June, 1899, to the United States, England, France, and Germany:

Articles.	1897.				1898.			
	United States.	England and colonies.	France.	Germany.	United States.	England and colonies.	France.	Germany.
Amethysts ....packages			23	79		16	4	50
Cocoa....bags of 60 kilos	11,362	43,719	14,969	49,625	28,417	27,285	42,221	28,224
Coffee.....do	189,970	21,207	31,129	40,473	197,063	20,045	23,656	51,274
Cigars .....packages		7		15		3		6
Copaiba oil .....barrels	29			182	14	10		573
Coquilhos .....bags		135	6,315	745		326	15,885	361
Diamonds ....packages			5			2	5	
Gold and silver (old), cases			9			4	9	
Hides:								
Dry .....number	19,163	14,222	8,962	31,661	31,524	12,093	33,000	40,162
Salt .....do	19,996	2,002	13,538	77,136	14,392	3,000	7,500	73,367
Honey .....packages		20		16		9		62
Horns .....bags				1,572	35		3	1,285
Monozite .....do						1,300		2,558
Piassava {volumes		57,578	88	2,813	39	44,746	100	5,723
Piassava {bundles		19,189		963		15,228		432
Rubber.....volumes	1,381	1,058	392	593	457	1,560	265	1,076
Skins.....bales	1,689	52		2	2,681	203		
Sugar.....pounds	1,175,779	1,702,818			4,217,852	1,948,470	6,173	
Tobacco, leaf and rolls, pounds	160		2,832,765	52,427,504		4,071,886	5,239,386	54,842,435
Wood:								
Rose.....logs	2,181	2,520	1,860	279	3,408	1,614	247	
Brazil.....do	893	41		2,392	258		230	
Various.....do				208	1,805	1,882	937	23

There were besides 750 tons of manganese shipped to England in 1898, and 1,891 to France. The principal exports from Bahia for the same countries from January 1 to June 30, 1899, were as follows:

Articles.	United States.	England and colonies.	France.	Germany.
Cocoa.....bags	10,747	21,588	9,656	16,375
Coffee.....do	105,531	3,347	5,981	6,347
Cigars.....packages		1		8
Copaiba oil.....barrels	22	42		
Coquilhos.....volumes		470	2,520	1,701
Gold and silver.....cases		10	2	
Hides:				
Dry.....number	63,005	13,595	19,175	27,925
Salt.....do	3,849	2,724		32,343
Manganese.....tons	4,522			
Piassava {volumes		10,287		8,901
Piassava {bundles		4,093		4,304
Rubber.....packages	211	547		301
Skins.....bales	1,931	395		
Tobacco (leaf).....do		5,810	28,796	59,608
Woods.....logs	1,116	1,383	825	428

There were besides these shipments 49 packages of amethysts, 1,412 packages of horns, 4,300 rolls of tobacco, and 180 tons of monozite sent to Germany, and 1 package of diamonds to France.

Brazilian custom-house statistics give the official value of dutiable imports at Rio de Janeiro during the year 1899 as follows:

Country of shipment.	Milreis.	Country of shipment.	Milreis.
British Empire	88,812,415.426	Chile	
Germany	23,580,818.871	Austria	1,076,740.851
France	23,217,128.872	Holland	492,647.774
Argentina	20,964,906.025	Sweden	197,195.783
United States	17,866,616.185	Switzerland	163,194.400
Uruguay	14,467,711.765	Japan	162,845.316
Portugal	12,883,110.420	Other countries	10,839.166
Belgium	8,893,784.355		32,362.010
Italy	5,806,769.865	Total	220,686,984.492
Spain	2,058,900.408		

The nondutiable imports for 1899 were subsequently reported to have been valued as follows:

Country of shipment.	Milreis.	Country of shipment.	Milreis.
British Empire	5,894,560.228	Italy	24,350.866
Germany	1,513,537.615	Spain	320.000
France	329,342.954	Chile	1,600.000
Argentina	328,417.000	Austria	44,269.600
United States	306,327.040	Holland	62.500
Uruguay	4,410.000		
Portugal	41,422.085	Total	8,675.078
Belgium	687,251.184		

The commerce of Brazil with the United Kingdom, France, and Germany, by leading articles, from 1894 to 1897, is shown in the following tables from official publications:

Value of exports from Brazil into the United Kingdom.

Articles.	1894.	1895.	1896.	1897.
Bones (except whale fins)	[1]£32,046	£33,443	£16,761	£18,208
Caoutchouc	2,020,799	2,176,189	3,017,921	2,671,569
Cocoa	78,482	118,520	51,814	89,814
Coffee	384,512	431,681	186,742	190,273
Cotton, raw	733,992	249,490	201,589	303,425
Drugs, unenumerated	6,438	5,432	19,423	4,456
Fruits, including nuts	129,094	71,114	83,474	75,285
Hides, raw	11,814	39,111	31,125	31,601
Horns and hoofs	731	1,099	1,064	1,523
Isinglass	16,977	12,490	12,561	10,996
Seeds, cotton	109,747	50,738	27,301	35,675
Skins and furs of all sorts	8,878	4,328	565	21
Sugar, unrefined	271,424	237,772	190,108	143,062
Tobacco, manufactured	2,154	3,140	2,335	3,577
Wood	1,702	90	3,597	12,570
All other articles	131,279	129,518	207,283	144,344
Total	3,940,069	3,614,155	4,053,663	3,736,419

[1] The pound sterling is reckoned at $4.8665.

Value of exports from Brazil into France.

Articles.	1894.	1895.	1896.	1897.
	Francs.[1]	*Francs.*	*Francs.*	*Francs.*
Bones, horns, and hoofs	338,441	132,336	379,476	306,606
Caoutchouc and gutta-percha, crude	5,929,302	7,269,822	9,659,472	10,401,510
Cocoa	8,534,117	10,558,816	5,949,602	7,386,402
Coffee	66,157,834	139,000,512	99,589,540	116,965,138
Cotton, raw	123,425	----------	37,097	35,560
Drugs, etc.: Glycerin	85,604	122,808	166,564	247,416
Farinaceous substances	35,960	48,431	115,442	114,716
Fruits: Nuts	88,650	44,088	22,183	64,458
Grease, including of fish	62,529	71,076	31,078	----------
Hair	77,152	41,755	37,847	19,029
Hemp, manila and other	149,995	37,840	43,508	182,385
Hides	6,034,488	5,867,170	8,604,879	6,004,263
Tobacco, leaf and stems	1,005,751	2,088,662	1,190,727	1,767,546
Wood	324,722	508,659	608,910	809,186
All other articles	1,065,889	935,629	460,148	495,698
Total	90,018,949	166,727,604	126,896,563	144,799,913

Value of exports from Brazil into Germany.

Articles.	1894.	1895.	1896.	1897.
	1,000 marks.[2]	*1,000 marks.*	*1,000 marks.*	*1,000 marks.*
Bones, horns, and hoofs	201	237	227	317
Caoutchouc and gutta-percha	930	1,774	2,079	2,147
Cocoa	653	1,206	1,332	3,071
Coffee	71,173	98,537	84,220	63,937
Drugs, dyes, etc	480	287	382	389
Fruits, including nuts	----------	87	89	60
Hair, including feathers and bristles	15	43	21	30
Hides and skins	10,486	15,277	8,569	15,725
Tobacco, leaf and stems	13,142	16,871	18,192	32,964
Wood, etc	233	254	252	435
All other articles	1,672	3,080	2,503	7,186
Total	98,994	137,655	117,876	126,261

Value of imports into Brazil from England during the same period.

Articles.	1894.	1895.	1896.	1897.
Apparel and haberdashery	£57,521	£52,168	£42,441	£30,981
Arms, ammunition, and military stores	102,365	62,163	143,002	68,152
Caoutchouc, manufactures of	50,926	47,899	49,727	33,938
Carriages, railway, and parts of	76,474	105,191	109,382	122,286
Cordage and twine	29,969	30,866	20,125	20,565
Cotton, manufactures of:				
Entered by the yard	2,630,589	2,179,757	1,863,096	1,362,407
Yarn	98,647	89,763	117,100	101,665
All other	468,949	471,910	398,504	408,828
Earthen, china, and glass ware	122,135	125,719	125,696	91,231
Iron and steel, and manufactures of:				
Iron, wrought and unwrought	605,142	663,237	756,686	598,225
Hardware, cutlery, implements, and tools	304,582	276,339	267,786	187,042
Machinery	621,411	624,523	628,439	323,358
Jute, manufactures of: Piece goods	82,195	75,036	33,549	65,041
Leather, and manufactures of	245,584	245,422	199,402	144,069
Linen, entered by the yard	124,721	108,453	81,747	60,452
Medicines, chemicals, drugs, etc	138,460	155,947	123,254	109,068
Metals, not elsewhere specified:				
Copper, wrought and unwrought	75,484	79,901	73,766	74,555
Lead, and manufactures of	9,461	11,272	11,709	11,396
Oilseed	48,831	54,834	47,089	43,387
Painters' colors and materials	35,251	44,857	40,118	40,503
Stationery, other than paper	18,649	18,640	17,782	14,371
Telegraphic wire and apparatus	19,848	236,794	45,991	75,702
Umbrellas and parasols	6,540	6,790	(3)	(3)
Wood, manufactures of	12,033	20,473	14,701	23,517
Wool, manufactures of	376,214	390,125	295,265	164,124
All other articles	1,348,597	1,145,557	1,157,647	1,256,461
Total	7,525,986	7,323,696	6,664,004	5,431,234

[1] The franc is reckoned at 19.3 cents. [2] The mark is reckoned at 23.8 cents. [3] Not specified.

Value of imports into Brazil from France.

Articles.	1894.	1895.	1896.	1897.
	Francs.	*Francs.*	*Francs.*	*Francs.*
Candles	223,874	236,449	166,842	143,459
Chemicals: Medicines, prepared, etc.	2,787,387	2,919,810	2,204,696	2,190,505
Earthen and glass ware	1,388,158	1,831,861	1,618,020	1,537,338
Fancy goods, including fans, buttons, perfumery, etc	8,424,481	9,866,179	8,543,611	6,917,310
Fish, packed in oil, etc	417,175	315,927	330,806	191,017
Hair of all kinds	295,728	285,320	141,593	153,620
Hats of straw and felt	871,111	608,210	435,389	619,807
Instruments for scientific purposes	196,322	196,760	184,962	250,044
Iron and steel, and manufactures of	3,077,537	3,377,120	3,792,299	3,381,778
Jewelry and watches	2,462,205	2,024,223	1,498,953	1,448,129
Leather and skins, and manufactures of	7,095,928	8,666,153	6,356,479	6,647,890
Oils; Olive	28,949	27,501	30,362	81,837
Paper, books, engravings, etc	2,246,737	3,361,883	2,426,371	3,037,794
Provisions: Butter and cheese	6,674,446	6,125,234	7,984,434	7,595,199
Spirits, distilled, and liquors	541,123	666,271	461,062	280,776
Textiles, including laces, ribbons, etc.:				
Of cotton	5,998,383	6,470,469	5,497,937	3,578,646
Of flax and hemp	114,358	189,974	105,019	105,390
Of silk	626,906	754,062	668,100	361,809
Of wool	7,652,557	8,304,624	8,149,582	7,761,163
Vegetables, fresh and salted, etc	1,359,334	964,294	1,039,536	1,527,240
Wearing apparel	12,903,762	7,227,589	5,792,535	4,068,838
Wine	3,926,445	4,300,981	3,490,120	2,716,875
Wood, and manufactures of	426,779	427,169	415,542	336,186
All other articles	10,387,170	6,613,912	7,247,722	5,968,347
Total	80,116,855	75,761,955	68,581,972	60,900,967

Value of imports into Brazil from Germany.

Articles.	1894.	1895.	1896.	1897.
	1,000 marks	*1,000 marks*	*1,000 marks*	*1,000 marks*
Beer of all kinds	1,512	1,914	894	500
Caoutchouc and gutta-percha, manufactures of	311	406	506	454
Chemicals, dyes, etc	2,068	3,245	2,943	3,164
Cotton, manufactures of	11,780	15,387	9,293	6,411
Earthen and glass ware	2,223	1,223	1,440	1,045
Flax and hemp, manufactures of	691	742	602	534
Gold and silver, manufactures of	1,015	975	720	1,029
Instruments, machinery, and carriages	3,767	4,295	3,212	5,595
Iron and steel, and manufactures of	8,596	16,334	11,776	7,329
Leather, and manufactures of	2,140	2,440	1,986	1,534
Oils and grease	88	98	78	72
Paper, and manufactures of	2,359	3,577	3,078	2,862
Silk, manufactures of	1,102	1,557	1,324	1,136
Soap and perfumery	257	295	217	147
Wearing apparel, etc	2,461	2,311	2,377	1,336
Wood, and manufactures of	1,109	1,820	1,961	1,732
Wool, manufactures of	7,994	9,563	6,010	3,462
All other articles	7,527	10,749	11,420	11,874
Total	57,000	74,931	60,337	50,216

In the calendar year 1900, according to the British statistics, Brazil exported to Great Britain 10,658,000 pounds of sugar, valued at £55,413. In 1899 the exports were 12,664,500 pounds, worth £63,849. The exports of coffee in 1900 aggregated 4,593,200 pounds, valued at £96,323, against exports of 8,351,400 pounds, worth £143,444, in 1899. The exports of cotton increased enormously both in quantity and price, the totals being 27,046,200 pounds, worth £669,595, in 1900, and 4,879,100 pounds, valued at £97,096, in 1899. The other exports enumerated were 1,283,500 pounds of wet hides, valued at £31,200, against 1,395,700 pounds, valued at £32,013, in 1899. The aggregate value of the four items was £852,531 in 1900, against £336,402 in 1899.

The value of the rubber taken by Great Britain was not separately returned.

The principal articles and their values imported from Great Britain in 1900, compared with 1899, were as follows:

Articles.	1900.	1899.
Cotton piece goods	£1,196,298	£1,359,838
Jute yarn	262,380	211,355
Linen piece goods	66,952	70,147
Woolen tissues	71,075	79,007
Worsted tissues	122,298	122,133
Manufactured copper	63,227	53,015
Hardware and cutlery	63,598	76,182
Railroad iron	94,951	93,426
Galvanized sheet iron	41,427	46,812
Other manufactured iron	278,755	333,203
Tin plates	74,187	71,467
Manufactured steel	14,387	49,591
Boots and shoes	40,137	49,106
Cement	21,453	34,211
Earthen and china ware, etc	64,471	60,203
Seed oil	54,194	43,761

The aggregate value of the items enumerated for the two years in comparison shows a loss of £233,677 ($1,088,524 in United States currency), the totals being $2,529,780 in 1900 and $2,753,457 in 1899.

According to an authority[1] the trade of Brazil with the United States from 1896 to 1900 is represented as follows for the respective fiscal years ending June 30:

Year.	Exports to the United States.	Imports from the United States.
1896	$71,060,046	$14,258,187
1897	69,039,389	12,441,095
1898	61,750,369	13,317,036
1899	57,875,747	12,239,036
1900	58,073,457	11,578,119

The commercial statistics bureau of Brazil has published the following summary of the value of the exports from the ports of Rio de Janeiro and Santos for the twelve months ending December 31, 1900: Animals and animal products, 4,494,933 *milreis;* minerals and mineral products, 18,214,940 *milreis;* vegetable products, 447,434,619 *milreis*, and specie, 3,105,727 *milreis;* a grand total of 473,250,219 *milreis.*

The coffee exported from the ports of Rio, Santos, Victoria, and Bahia during the first six months of the calendar year 1900, according to the same publication, amounted to 2,929,259 bags of 60 kilos each, the exports to United States ports being as follows: New York, 1,493,460 bags; Baltimore, 161,305; New Orleans, 67,236; Galveston, 21,905.

As is the case in most of the South American Republics, so in Brazil the tariff on imports is subject to continuous changes, the customs receipts forming the basis for the estimates of the annual budget.

[1] Statistical Abstract of the United States, 1900. Prepared by the Bureau of Statistics, Washington, D. C. No. 23.

The Tariff Law now in force is in the main that enacted December 17, 1897, amended November 27, 1899, and containing the subsequent reforms introduced to meet certain special conditions.

The Tariff Law enacts that the tariff authorized by the law of the 17th December, 1897, is to be in force in all the custom-houses, with certain alterations; that "the system of the revised tariff shall be duplex, with maximum and minimum rates, the minimum being the existing tariff with the alterations made in this law, and the maximum that with double the duties specified in the minimum;" and that "in the execution of the tariff thus drawn up the Government will indicate to the customs department which are the countries whose products shall be subjected to the minimum and maximum rates, the Government having the right to modify such rates entirely or partially, with such diminutions as it may think fit to make in the terms of article 5 of the revenue law."[1]

A synopsis of the general provisions of the Tariff Law is as follows:

All foreign merchandise imported for consumption in Brazil is subject to the payment of such duties as are set forth in the tariff, except those otherwise provided for, and to this end the following are considered foreign merchandise: (1) All foreign merchandise imported from a foreign country, whether for direct consumption, or in transit, or in ships lying at the offing of any Brazilian port, or arrived in ships in stress, which should be disposed of for consumption. (2) The cargo and effects in seized vessels; the rigging, stores, arms, ammunition, or any other serviceable objects in any merchant or war vessel; the fragments or pieces of hulls of foreign ships when any of these effects are sold for consumption. (3) Small craft belonging to any vessel withdrawn from service and either sold or transferred at any port in the Republic. (4) Foreign goods that have become nationalized through the payment of import duties, when they are carried from one port of the Republic to another without the proper license or permit. (5) Domestic merchandise and effects when carried from one port of the Republic to another and can not be readily distinguished from similar foreign products. (6) Merchandise washed ashore or found floating or at the bottom of the sea, rivers, or lakes, as specified by law.[2]

The Brazilian free list is contained in 36 paragraphs, their most important provisions being as follows: Free entry is granted to the following goods, provided a bond has been given, as specified by the

[1] Article 5 of the revenue law runs as follows: "The Government is authorized to adopt a differential tariff for one or more articles of foreign production, compensating concessions made to articles of Brazilian production when treated as proceeding from a most-favored nation, or vice versa."

[2] The Tariff Law of Brazil is too voluminous to be inserted in this work. The Bureau of the American Republics will furnish any information on the subject upon application. Changes are noted in the Bulletin of the Bureau.

tariff: Samples of a trifling value or no value whatever; models of machinery, ships, instruments, etc., and any invention or improvement made in mechanics; agricultural implements and instruments belonging to any of the liberal or mechanical arts; implements and effects brought into the country by the colonists or immigrants themselves, as provided by law; effects belonging to foreign ambassadors or ministers or imported by them in conformity with the regulations, and those belonging to members of the Brazilian diplomatic corps, as provided by law; merchandise and effects belonging to foreign war vessels, their officers and crews, as specified by the tariff; merchandise and effects either the product of domestic industry or nationalized through the payment of import dues which, having been exported, should return to the country on any ship, provided (1) that they can be readily distinguished from similar goods of foreign origin; (2) that they return within a year from date of sailing from a national port; (3) that they are accompanied by a certificate issued by the custom-house authorities of the foreign port whence they come, duly authenticated by the Brazilian consular agent, as provided by law; scientific instruments, personal baggage, and effects of passengers; books, charts, and works of art, when in conformity with the regulations; barrels, cases, boxes, casks, etc., containing merchandise, when duty on said goods is not levied according to gross weight, and when they are not empty nor have become emptied of their contents, and straw used as wrapping and not for any other purpose; foreign merchandise on which import duties have been collected at any custom district of the Republic, and are reshipped in Brazilian ships to any national port, as provided, and any merchandise and effects exempt from duties, either by the tariff or by virtue of special concessions, or those imported on account of the nation for the service of the Republic.

The products of the national fisheries and products imported through the interior of the States of Amazonas, Pará, and Matto Grosso from any of the neighboring territories, provided they are original products of said neighboring territories, in accordance with the treaties and conventions in force with said countries. The material imported by the shipbuilders of Brazil for the construction of ships and steamers in Brazilian shipyards, as prescribed by the tariff. Effects belonging to theatrical companies or of a scientific value, antiquities, statues and busts for public ornament, or any other effects destined for public exhibition, provided the provisions of the law are complied with. Chemicals and other products used as fertilizers, live animals[1] for breeding purposes, school materials, etc.

[1] An amendment now in force of this provision states the following: "Cattle of all kinds imported across the frontier of the Rio Grande do Sul for the purposes of breeding, consumption, working, or any other destination, provided they shall not be subsequently forwarded to any other port of the Republic, which would be considered as contraband."

Machinery and parts thereof, when imported directly by mining companies for their own use, will only pay a tax of 5 per cent.

The tariff law prohibits the importation of the following: Paintings, lithographs, sculptural works, or any other article of obscene character or calculated to injure the morals of the people; printed matter and works of prohibited publication; daggers, bowie knives, air pistols and rifles; canes, umbrellas, or any other similar objects containing concealed weapons of any sort; powder and explosives of any description, arms and munitions of war, except as provided by law; and any merchandise, alimentary or medicinal product in a state of decomposition or damaged, injurious to public health.

Under no consideration is distinction made in the application of the tariff and collection of duties in favor of any goods, their owners or importers, unless provided by law, and no article whatever will be considered different from that specified in the tariff because it contains a modification or a part not specified which does not change its nature, quality, or use, even if it bears a different name.

Manufactured or embroidered goods containing ornamentations in gold, silver, or precious stones, not specified or embraced in a special provision, are subject to pay ad valorem duties in proportion with the rates collected on similar products having neither ornamentation nor embroideries. Goods not specified containing in their composition different materials are subject to the same rating affecting similar products made exclusively of the predominating material, or the rating applied to the material paying the highest duty, according to the case.

Fabrics containing silks are assessed as follows: (1) Mixed fabrics in which all the threads of the woof or all the threads of the warp are silk and the rest of any other material, are dutiable as similar fabrics made entirely of silk, less a rebate of 20 per cent. (2) Mixed fabrics in which the warp and the woof are all of silk, but having in either or both visible threads of any other material, will pay the duties corresponding to similar fabrics made entirely of silk, less a rebate of 20 per cent. No rebate, however, will be granted to silk fabrics in which threads of any other materials paying lower duties are found, either in the warp or in the woof in such insignificant proportion as not to alter the nature, importance, or value of the fabrics. (3) Mixed fabrics in which the warp and the woof are of different materials, but containing in the woof or in the warp, or in both a few threads or mixture of silk, will pay duty according to the highest assessed material, plus 30 per cent. (4) Fabrics of any material whatever containing either gold or silver, and not especially provided for in the tariff, will pay the same duties established by law for the plain articles, plus 20 per cent. When the duties are assessed on fabrics according to the number of threads, a space of 5 square millimeters is counted by means of an instrument called "thread counter" and the sum of the threads in the warp and in the woof will determine the

number of threads in the fabric. In mixed fabrics where the threads are irregularly woven an average will be taken.

The tariff also sets forth the rules to be observed in assessing goods not specified, as follows: When duties are paid ad valorem, the basis for the assessment will be the price of the goods at the place whence exported, plus all subsequent expenses, such as export duties, freight, insurance, commission, etc., incurred up to the arrival of the goods at the port of destination. Should these data be wanting, or the price as declared be deemed contrary to the interests of the national revenues, then the basis will be the wholesale price of said goods at the market of import, less the duties collected on them, plus a surcharge of 10 per cent. Ad valorem duties paid by goods not specified shall in no case be less than the duties paid by similar goods when specified.

In all cases of importation of goods, consular invoices, made according to the regulations and duly legalized by the Brazilian consul or whoever represents him, must be presented at the custom-house, and for the assessment of ad valorem duties the values declared in such invoices must be taken as a basis, at the rate of 12 pence to 1 milreis. In case of false declaration or presentation of an invoice in which the values declared do not agree with the market value of the goods, a fine not to exceed three times the value of the proper duties will be imposed upon the owner of said goods. In case of doubt the matter will be submitted to arbitration, as provided, and should the value estimated by the arbiters not exceed 5 per cent over that declared by the importer, duties will be assessed taking as a basis the declared invoice value. In a contrary case the assessment will be made on the basis of the value as decided by the arbiters, but if this value is 50 per cent higher than the value declared in the invoice, a fine of 50 per cent over the regular duties will be imposed upon the importer.

No rebate or allowance on the duties will be granted except in the following cases: (1) Tare; (2) damage; (3) loss by breakage; (4) casual and unforeseen injury sustained by the goods deposited in the national warehouses; and (5) by virtue of a special law. Goods dutiable by weight will pay duties as provided by the tariff, and whenever not specified net legal weight is understood. Net *real* weight is that of the goods or effects separated from either their internal or external wrappings. Gross weight is that of the goods or effects in their wrappings or packings, including paper, tarpaulin, or any other material used for the proper preservation of the contents, except thick wood casing. Net *legal* weight is the difference between the gross weight and the tare, as prescribed by law. In determining the weight of goods, duties by weight, etc., the provisions laid down by the tariff are to be followed.

Damaged goods are those which have deteriorated either by reason of the sea voyage or due to circumstances occurring during the trip

until the time of their arrival at the custom-house or by reason of intrinsic defects in the goods. Rebate is allowed in case of damage, loss by breakage, etc., pursuant to the provisions of the tariff.

The following general provisions refer to the shipment of merchandize to Brazil and clearance from the custom-house:

"On exporting merchandise to any of the Brazilian ports, the exporters or shippers must present at the Brazilian Consulate, at the port whence the goods proceed, two invoices, which must be authenticated by said consul, one being delivered to the shipper to accompany the cargo and the other remaining in the Consulate, which, in its turn, shall transmit it to the authority in the Federal Capital charged by the Government with the compilation of general statistics.

"Those intending to clear any articles or goods subject to duty are obliged to present to the chief of the competent custom-house the bill of lading and consular invoice, which shall be registered with the manifests and other documents proving the origin of the articles or goods to be cleared and their title to claim the same. The absence of the consular invoice shall entail the goods being cleared at the highest rate of the tariff.

"Every bill of lading which must be attached to the manifests shall be accompanied by a declaration signed by the shipper, who shall draw it up or cause it to be drawn up, of the goods in the package or packages included in each of the said bills of lading, the same to be authenticated according to the law in the premises. The captains or masters of ships shall not admit the legalization of the bills of lading without the shipper producing such declaration. The absence of such a declaration, or the fact of its divergence from the contents of the package or packages at the port of destination, shall be considered as an infraction of the fiscal legislation, the importer of the article being punished by a fine equal to the duties in both cases; the captains or masters, however, shall be punished with a fine equal to double the duties leviable for the mere absence or nondelivery of such a document.

"For the clearance of goods liable to ad valorem duties, as well as for all other clearances, the interested parties must furnish consular invoices of the goods imported by them duly viséed by the Brazilian Consul at the place of origin, confirming the declared value, which shall be calculated at the rate of exchange of 12 *pence* per 1,000 *reis*.

"Imported articles or merchandise which may belong to different classes of the tariff and which may be discovered hidden or not, and of which special mention shall not have been made in the dispatch papers or notes, shall be considered as contraband and seized according to the terms of legal procedure in such cases.

"All the fines leviable in the custom-house departments of the Union under the 'Consolidation' shall be doubled except in the already existing cases of double fines for differences of quantity of merchandise of

the same class and differences of quality of merchandise of a different kind from that specified in the dispatch papers, and also those connected with the dispatch of goods in cases of 'contents unknown' accepted by the custom-houses, which shall remain at 1½ to 10 per cent on the value."

The following new provisions have been added:

"The fine on clearing goods prescribed by the custom-house legislation in force shall be from 1½ per cent to 5 per cent, at the discretion of the custom-house inspectors, according to the circumstances of the facts. The fine of double duties on differences found when 'conferring' the goods shall be imposed when the duties on the differences shall exceed 100 *milreis*."

The new consular invoice law of Brazil is summarized as follows:

All merchandise, including specie and bullion, dispatched from foreign countries for Brazilian ports must be accompanied by the corresponding consular invoices, with the exceptions enumerated in article 3.

These invoices may be made out in Portuguese or in the language in use at the port of shipment, and must be legalized exclusively at that port.

The declarations contained in the invoice shall determine:

(1) Name of the ship in which the goods are shipped; (2) port of shipment; (3) port of destination; (4) value of the goods; (5) freight and expenses; (6) premium on the money current at the port of shipment, if any.

On the back of the invoice the goods are to be detailed, giving marks and numbers of the packages, specifications of the merchandise, its net and gross weight; value, including or excluding freight and expenses, of each different kind of goods, and country of origin of same.

These data are obligatory, including the statement of approximate freight and expenses, and omissions will make consignees liable to fines.

Description of the merchandise may be either specific, giving the name of each separate article, with the material of which it is composed, or may be generic, in accordance with the official nomenclature organized for that purpose. It is, however, absolutely forbidden to make use of generalizations, such as "cotton textiles," "ironware," etc., not admitted in this nomenclature. Infringement in this respect will subject the consignee to fines.

Translations have been prepared of the nomenclature and regulations into English, French, German, Italian, and Spanish.

Although declaration of origin is exacted, proofs will not be demanded at present, nor until a differential tariff be enforced against the goods of any country, of which there is no immediate prospect.

The routine to be followed with regard to these invoices is as follows:

(1) The invoice must be filled up by the merchant and forwarded to his agent (if shipped at another place) to be legalized (viséed) at that consulate. The original, of which three copies are to be made, must be stamped, and, after being viséed, be handed to the shipper to be forwarded with the bill of lading to the master of the vessel, who, in his turn, must return it with the corresponding invoice and manifest to the consul to be forwarded to the respective custom-house. The captain must note in the margin of his manifest any goods shipped for which no invoices have been received, his notes being certified to by the consul, as also the cause of nonreception of the invoices by the captain. On this being done, the captain will have no further responsibility on arrival; otherwise he will be liable to fine for nondelivery of invoice.

(2) Of the three copies of the original invoice, one will be forwarded by the Consul to the Statistical Bureau, a second will be retained at the consulate, and the third handed to the shipper to be forwarded to the consignee to accompany dispatch of the goods at the custom-house. Without the corresponding invoice, no dispatch can be granted except on signature of a bond (*termo de responsabilidade*).

(3) The declaration of the invoice may be made in the language used at the port of shipment or in Portuguese, as desired, a translation of same being in the former case presented by the consignee on dispatch of goods at the custom-house. This translation need not necessarily be by public translator.

The fee for legalization of consular invoices will, for the current year, be 5 *milreis* gold ($2.73), payable in stamps to be applied to the original only. This, of course, does not exempt from payment of the tax on bills of lading (2 *milreis*).

The number of vessels engaged in the foreign trade entered at Rio de Janeiro during the year 1898, was 1,218, with an aggregate tonnage of 2,069,161 tons, divided as follows: Sail, 295, with a tonnage of 271,064, and steam, 923, with a tonnage of 1,798,097, against 347 sail and 927 steam, with a tonnage of 306,599 and 1,840,225 tons, respectively, in 1897. There cleared from the same port in 1898, 301 sail and 829 steam vessels, with a tonnage of 271,401 and 1,686,670 tons, respectively, against 361 sail and 858 steam, with 316,580 and 1,728,278 tons, respectively, in 1897. The largest number of ships entering the port in 1898 were: British, 122 sail, 424 steam; French, 2 sail, 154 steam; German, 20 sail, 105 steam; Norwegian, 57 sail, 13 steam; Portuguese, 21 sail, 15 steam; American, 39 sail, 3 steam; the clearing being in the same proportion. At Pernambuco there entered in all 887 vessels, representing a total of 1,106,556 tons; and cleared 870, of an aggregate tonnage of 1,096,077 tons. At Ceará there entered 266,

of 321,645 tons, and cleared 182, of 35,024 tons. At Penedo the vessels entered amounted to 182, with 34,998 tons, and those that cleared to 183, of 35,024 tons; and at Parahyba there entered 192 of 183,587 tons, and cleared 193, of 183,732 tons.

The merchant marine of Brazil employed in the coasting trade consisted in 1898 of 229 steamers, with a tonnage of 94,262 tons net, and 344 sailing vessels, with an aggregate tonnage of 88,000 tons net. In 1897, the merchant marine consisted of 212 steamers, of 70,680 tons, and 388 sailing vessels, of 26,637 tons.

During the first six months of 1900, 691 steamships and 203 sailing vessels entered the port of Rio de Janeiro, and 704 steamships and 218 sailing vessels cleared from that port. At the port of Santos the movement during the same period was as follows: 257 steamships entered and 261 cleared, while 27 sailing vessels entered and 30 cleared.

CHAPTER XI.

FINANCIAL CONDITIONS.

The finances of Brazil have been one of the most difficult problems the country has had to deal with for several years. The discussion of the financial conditions of the Republic has brought with it serious prejudice against the credit of the nation, and Brazilian bonds have undeservedly been quoted in the European markets so low as to be sometimes near one-half of their face value. They were quoted at an average of 70 per cent in December, 1900.

Brazil possesses such immense natural wealth that this in itself should be sufficient to inspire confidence in the most skeptical minds, without mentioning the fact, which speaks highly in favor of the country, that it has always met promptly all its foreign and domestic obligations. A dispassionate view of the situation is, therefore, far from exciting fears of bankruptcy and ruin.

The fact is that Brazil has been through a crisis, due to a multiplicity of causes, beginning with the abolition of slavery in 1888, which naturally caused a complete transformation in the social condition of the country, and the organization of the Federal Government in 1890–1891.

Immigration to replace slavery on the plantations came at a tremendous cost; but the effect of free labor has surpassed all expectations. The production of coffee jumped from five to twelve million bags, such an overproduction causing a still greater fall in the prices. Brazil has had, therefore, as a recompense of its energetic effort, a shortage in national wealth. The bag of coffee which was worth $20 became suddenly valued at about $5, a round loss of $180,000,000 in a year. This would be sufficient to explain the financial depression.

The unsettled condition of public affairs in the Republic must be also taken into consideration. The revolt of the navy in 1893–1895, which was connected with a revolutionary movement in Rio Grande do Sul, cost the Government 140,000,000 *milreis*, or about $28,000,000 (at the rate then prevailing of 20 *cents* per *milreis*), besides incalculable damage to war material and private and public property. More recently the expeditions against the fanatics of Canudos compelled the Federal Government to send to the interior of Bahia a force of 10,000 men, besides arms and ammunition. Of the 140,000 *contos* spent directly by the Treasury at the time of the revolt of the navy, 75,000 were covered by the emission of notes. Previous emissions had already increased the great mass of paper money that was put into circulation, especially after the proclamation of the Republic, in order to

satisfy the fever of speculation which followed the abolition of slavery and the change of government. The subsidies granted by the Government for the development of new industries also increased the burden already weighing upon the nation. The deposits of the banks as guaranty for their emissions, which later were assumed by the Treasury, consisted partly of gold and partly of bonds of the public debt. These served as security for other bonds and enlarged the already overburdened liabilities of Brazil. The withdrawal of coin which was circulating together with paper money, made the exchange fall to even less than one-fourth of the nominal value of the milreis.

The issue of paper money in Brazil began in 1809, when the Banco do Brazil made its first issue, shortly followed by others, so that in 1827 the emission amounted to over 40,000,000 *milreis*. The history of these issues repeats itself, under various phases, such as bank issues, made void by the Government, and Treasury issues. In 1889 the quantity of paper money of compulsory circulation amounted to over 192,000.000 *milreis*. After the proclamation of the Republic these issues increased so rapidly that from year to year they rose to 297, 513, 561, 631, 712, 778, 711, 720 and 785 thousand *contos de reis*, the last figure being for 1898.[1]

Having always been a country of treasury paper money (from 1808), Brazil has always suffered from great oscillation of exchange. After a good harvest or a considerable foreign loan exchange has risen sometimes to very near or above par, falling more or less rapidly some time after. This is very well illustrated by the oscillations in the last years of the Empire, viz, from 1885 to 1889, when the Republic was proclaimed. The minimum value of the Brazilian *milreis* was, in 1885, 17⅛ English *pence;* in 1886, 17$\frac{3}{16}$; in 1887, 21½; in 1888, 22½; and in 1889, 27¼. This rapid rise was chiefly due to a large loan, the sale of a railroad concern, and good crops.

The average rate of exchange in 1889 was 27½ pence per *milreis;* in 1890, 22⅝; in 1891, 16$\frac{11}{32}$; in 1892, 11$\frac{5}{16}$; in 1893, 11$\frac{9}{16}$; in 1894, 10$\frac{3}{32}$; in 1895, 9$\frac{5}{16}$; in 1896, 9⅛; in 1897, 7$\frac{23}{32}$, and in 1898, 7$\frac{3}{16}$, while the amount in paper money issued by the Government since 1809 increased to 785,911.758 *milreis*.

The value of paper money in circulation during the same years, according to the report above quoted, was represented as follows:

Year.	Paper money.	Gold.
	Milreis.	*Milreis.*
1889	192,800.000	196,308.960
1890	297,800.000	249,556.400
1891	513,727.000	311,010.325
1892	561,000.000	248,074.200
1893	631,700.000	270,557.110
1894	712,000.000	266,216.800
1895	678,100.000	249,608.610
1896	711,641.000	240,534.658
1897	720,962.158	206,123.080
1898	785,941.758	209,296.200

[1] Report of the Brazilian Minister of Finance, 1898.

On the 30th of June, 1900, the amount of paper money in circulation was estimated at 703,666.174 *milreis*, while on the 31st of August it amounted to 700,654.184 *milreis*, or a difference of over 3,000 *contos*, represented as follows:

	Milreis.
Amount in paper incinerated according to the funding loan scheme	3,000.000
Discount of notes given as substitutes	11.990

The paper in circulation on the 31st of August, 1898, amounted to 788,364.614 *milreis*, so that the amount withdrawn from circulation from that date to June 30, 1900, is represented by 87,710.430 *milreis*.

The Brazilian minister of finance, in his report above quoted, states that the principal cause of the economic situation of Brazil is due to the abnormally low price coffee has attained, its production being far in excess of the necessities for consumption, while the principal cause of the financial situation is the excessive issue of paper money, the quantity of which in actual circulation is far beyond the needs of the country; in other words, as the minister states:

"The two crises are perfectly equal as far as their general expression is concerned; superabundance of coffee in proportion to its consumption, and superabundance of paper in proportion to the value of circulation; a falling off in the price of coffee, and a falling off in the price of paper; a reduction of the total value of the national revenues, and a reduction of the total value of the revenues of the State."

Among the secondary causes the report referred to ascribes the deficits in the budgets which have steadily increased since the monarchy.

According to a British consular report,[1] "If Brazil has suffered for want of credit it is because in former times it was her misfortune to have enjoyed too great facilities for borrowing. This is shown by the financial history of the Empire. In the sixty-four years from 1822 to 1886 the accumulated deficits amounted to a sum of 758,181,792 *milreis*, at par, equal to £85,295,451, or, taking an average exchange, of 20d., equal to £63,000,000. It may be argued that the cause of these constant deficits was capital profitably expended in the construction of railways, ports, and other useful objects by which the national wealth has been increased." The report says further on that during the nine years (1889–1897) of the Republic the deficits amount to 343,064,000 *milreis*, or at average rate of exchange equal to about £19,000,000. The large sums borrowed during this period have been spent in making good deficits, war expenses, etc.

The report of the Secretary of the Treasury of Brazil for 1900 gives the following figures on the financial conditions of the Republic from 1897 to 1899. In 1897 the total revenues amounted to 774,993,659 *milreis*, and the total expenditures 473,795,160 *milreis*, leaving a balance of 301,198,498 *milreis*. In 1898 the revenues, including former

[1] Finances of Brazil, No. 2200, annual series. London, 1899.

balance, were 1,107,039,245, and the expenses 894,146,786 *milreis*, the balance to be carried over to the next year amounting to 212,892,458 *milreis*. In 1899 former balance and revenues were estimated at 633,035,391, and the expenditures at 568,195,247, which shows a balance of 64,840,144 *milreis*.

The Brazilian debt, as stated in the report above quoted, is divided into active and passive debt, some paid and quoted in gold, and the other in paper. Both debts include foreigu or external debt and internal debt. The active debt at the time of the report was as follows:

	Milreis.
External debt:	
Uruguayan debt	23,095,666
Paraguayan debt	135,718
Internal debt:	
Debt of the State of Bahia	18,081,718
Debt of the State of Pernambuco	9,281,023

The passive debt was as follows:

Foreign funded debt, £38,639,291.

	Milreis.
Internal funded (March 31, 1898)	483,520,600
1868 loan, 6 per cent, gold (March 31, 1898)	7,127,500
1879 loan, 4½ per cent, gold (March 31, 1898)	20,549,000
1889 loan, 4 per cent, gold	18,350,000
1897 loan, 5 per cent, paper	60,000,000
Floating debt	20,167,975

The budget for 1900 (law No. 640, November 14, 1899) estimated the general receipts of the country for that year at 289,048 *contos*, paper, and 44,948 *contos* (or million of *reis*), gold (44,948.876$593), besides 23,920 *contos*, paper, destined to the redemption fund, and 9,026 *contos*, 667,000 *reis*, gold, of the guarantee fund, and the resources from the funding loan negotiated in London, June 15, 1898.

The following are the receipts estimated in the budget:

	Gold.	Paper.
	Milreis.	*Milreis.*
Import duties	18,000.000	153,000.000
Clearance of free merchandise, warehouse charges, taxes, etc		8,250.000
Light-house and wharfage dues, etc	460.000	440.000
Additional 10 per cent on clearance of free merchandise, light-house and wharfage dues, etc	46.000	344.000
Interior revenue (railroads, mail, telegraphs, cable, national estates, consular fees, stamp tax, lotteries, water tax, etc.)	505.000	81,648.000
Consumption taxes		27,770.000
Extraordinary taxes	310.000	12,586.000
Deposits, balance between receipts and reimbursements		5,000.000
Resources, funding loan	25,627.876	
Redemption fund		23,920.000
Guarantee fund	9,026.667	
Total	53,975.543	312,958.000

The expenditures for 1900 are fixed by the law of November 23, 1899, at 36,973.646$021, gold, and 263,162.276$044, paper, as follows:

	Gold.	Paper.
	Milreis.	*Milreis.*
Department of Justice and the Interior		15,896.964
Department of Foreign Relations	1,055.000	526.920
Department of the Navy		23,076.977
Department of War		45,596.059
Department of Industries, Communications, and Public Works	13,459.068	62,235.140
Department of Finance	22,459.577	115,830.213
Total	36,973.646	263,162.276

When the Brazilian Government found that it was unable to meet its obligations in cash, it made a contract with Messrs. N. M. Rothschild & Sons, of London (June 15, 1898), by which this firm was authorized to issue an amount not to exceed £10,000,000, nominal capital, of 5 per cent funding bonds specially secured, primarily by the customs revenues of Rio de Janeiro, and further by those of all other customs districts should the former prove insufficient. The obligations were manifold, chiefly the loans made in foreign countries, the 5 per cent guaranty of the West Minas Railway Company, the 4½ per cent internal loan of 1897, and others. The arrangement with the Rothschilds provided that the sinking funds and loan redemptions should be suspended for thirteen years from July 1, 1898. Commencing with January 1, 1899, the Government agreed to deposit in trust with the London and River Plate Bank, the London and Brazilian Bank, and the Brazilianische Bank für Deutschland the equivalent of the 5 per cent funding bonds, proportionately as they were issued in London, in current paper currency, at the rate of exchange of 18d., the paper currency, the equivalent of the bonds issued from July to December 31, 1898, to be deposited in the same manner during a period of three years, commencing with January, 1899. The paper currency thus deposited was either to be withdrawn from circulation entirely and destroyed, or, in case exchange was favorable, to be used to purchase bills on London in favor of N. M. Rothschild & Sons, these to be placed to the credit of a fund to be applied toward the payment in gold of the interest on the loans and railway guaranties. The bonds will be redeemed by an accumulative sinking fund of ½ per cent per annum, to be applied half yearly by purchase of bonds when the price is under par or when at or above par by drawings. The redemption of the bonds by means of the sinking fund will commence at the end of ten years from June 30, 1901, but the Government reserves the right to pay off the loan at par at any time.

The most important feature of the scheme is the deposits of paper money in proportion as the funding loan is issued, as by this means an opportunity is afforded of reducing the excessive circulation of

paper money. The annual expenditure affected by the contract in reference, exclusive of the sinking fund and commissions, amounted at the time of the agreement to £2,873,620, represented by several loans and railway subsidies amounting to £1,773,950 and £1,099,670, respectively. Previous to this, by decree of the Government under date of June 11, 1898, further considerable saving was effected by converting the 4 per cent internal gold debt of 1890 into 5 per cent paper bonds.

The expenditures for the year 1901 are estimated by the Government at 244,514,194 *milreis* paper, and 37,509,985 *milreis* gold, and appropriations have been made by the National Congress for these amounts. The revenues are expected to produce an aggregate estimated at 286,082,200 *milreis* paper, and 58,869,741 *milreis* gold. This would leave a surplus, according to the figures of the minister of finance, of 41,568,000 *milreis* paper, and 21,359,000 *milreis* gold.

Import duties are to be collected in such a way as to make actual rates on a currency basis invariably equivalent to 139 per cent of the nominal rates when exchange is not above 10½d. per 1$000. For this purpose the amount collected in gold will be fixed at 25 per cent of the respective nominal rate, while the amount collected in currency will vary with exchange. When the exchange is above 10½d. per 1$000, 25 per cent of the duties will be collected in gold and 75 per cent in currency.

CHAPTER XII.

BANKING AND CREDIT.

The first bank was established in 1808. This was known as the "Banco do Brasil," which, however, ceased to do business in 1829. It was not until 1853 that banking was undertaken on a large scale. The most important banking institution at that time, also known as the "Banco do Brasil," had a capital of 33,000,000 *milreis*. It was a bank of issue, doing also a general banking business. In the early seventies there were two English banks—the London and Brazilian Bank, Limited, with a capital of £750,000, and the English Bank of Rio de Janeiro, Limited, with a capital of £1,000,000. There were also the Banco Rural e Hypothecario, with a capital of 8,000,000 *milreis;* Banco Commercial do Rio de Janeiro, with an authorized capital of 12,000,000 *milreis*, of which 1,809,000 *milreis* was paid up. All these banks have branches at the several ports. The following is a list of banks existing in 1889:

In the State of Rio de Janeiro, Banco do Brasil, Banco Rural e Hypothecario, Banco Commercial do Rio de Janeiro, Banco do Commercio, Banco Industrial e Mercantil do Rio de Janeiro, Banco Predial, Banco Internacional do Brazil, Banco União do Credito, Banco de Credito Real do Brazil, Banco del Credere, Banco Auxiliar, Caixa de Credito Commercial, Banco Popular, besides the foreign banks; in the State of São Paulo, Banco de Credito Real de São Paulo, Banco Mercantil de Santos, Succursal do Banco do Brazil em São Paulo, Banco da Lavoura de São Paulo, Banco Commercial de São Paulo, Casa Bancaria da Provincia de São Paulo, Nielsen & Cia., Banco Popular de São Paulo; in Minas Geraes, Banco Territorial e Mercantil de Minas; in Maranhão, the Banco do Maranhão (commercial and mortgage bank); in Pará, Banco Commercial do Pará, Banco do Pará Novo, and several other banking houses; in Bahia, Banco da Bahia, Banco Mercantil, Caixa Hypothecaria, Sociedade de Commercio, and some other banking firms; in Pernambuco, Banco Hypothecario, and a number of branch banks; in Rio Grande do Sul, Banco da Provincia, and some other banking houses and branches of foreign and national banks.

The most important of these was the Banco do Brasil in Rio, with branches everywhere.

In 1890 a decree was issued authorizing the creation of three so-called regional banks of issue for north, central, and southern Brazil, with a total capital of 450,000,000 *milreis*. The capital of

these stock banks was to be invested in 5 per cent Government obligations. By a gradual reduction of the interest the State was to cease paying it upon these obligations after the seventh year, but was to participate in the profits of the banks in so far as they exceeded 8 per cent per annum. It was hoped by this means in fifty years, at which time the charters of the banks would expire, to succeed in paying off the whole indebtedness.

The State granted to these banks certain business privileges, with exemption from customs duties, which in reality made them a commercial monopoly. In consequence of considerable dissatisfaction and reclamations on the part of the financial and commercial world the total issue was reduced from 450,000,000 to 200,000,000 *milreis*. At the same time the Banco do Brasil and Banco Nacional were each authorized to issue 50,000,000 *milreis* of bank notes upon depositing 25,000,000 in gold coin, bills of which issue were to be converted into gold under certain circumstances. Similar privileges were later granted to other banks, so that the total issue of 300,000,000 *milreis* was exceeded, and by 1891 over 700,000,000 was attained. The natural result was an inflated credit, with attendant disasters. To-day there are no more issues, neither from the Government nor from the banks, and the minister of finance has decided to burn regularly a certain amount of paper money every year, hoping by this means to destroy the evil effects of the inflation. Up to the 31st of October, 1900, nearly 100,000,000 *milreis* had been burned and a still larger amount is to be destroyed. Exchange has improved considerably, but it may be ascribed to the increase in the value of exports, as the price of coffee has substantially risen at the same time.

The Statesman's Year-Book for 1900 says:

"There is little metallic money in circulation in Brazil. The Congress has taken steps to reduce the amount of paper money in circulation by withdrawing notes to the value of about 2,000,000 *milreis* a week. The amount in circulation on July 31, 1899, was 740,764,141 *milreis*. In 1897 the Bank of the Republic was reorganized with a view to the liquidation of its debt of 194,649,000 *milreis* to the treasury. By the transfer of property and securities the debt had, by the end of 1897, been reduced to 94,670,150 *milreis*, and this balance is to be paid without interest within twenty years. The bank further agrees to advance for agricultural purposes 25,000,000 *milreis* on hypothecary notes issued by various local banks. The capital of the new bank is stated at 110,000,000 *milreis*."

On October 31, 1900, the amount of paper money in circulation was 699,548,729 *milreis*.

On April 30, 1900, the leading banking institutions of Brazil held as cash on hand the amount of 68,435$092 *milreis*.

The federal treasury had in the hands of the Banco da Republica do Brazil in Rio, 50,000.000 *milreis*, of which 14,344.747 *milreis* was in account current.

The capital and reserve funds of the following banking institutions on the same date are given as follows:

	Capital.	Reserve funds.
	Milreis.	*Milreis.*
Banco da Republica	101,246.800	17,490.078
Banco do Rio e Matto Grosso	20,000.000	391.700
London and River Plate Bank, Limited	1,500.000	1,000.000
Banco do Commercio e Industria de S. Paulo	10,000.000	6,000.000
Banco Mercantil de Santos	5,000.000	800.000
Banco Norte do Brazil	5,000.000	376.645

Besides these banks the following also exist whose capital and reserve funds are:

	Capital.	Reserve funds.
London and Brazilian Bank, Limited ..... pounds	1,500,000	600,000
Banque Française du Brésil ..... francs	10,000,000	.....
Brazilianische Bank für Deutschland ..... marks	10,000,000	.....
British Bank of South America ..... pounds	1,000,000	340,000

The status of the foreign banks in Rio de Janeiro, on the 30th of April, 1900, is given as follows:

	Milreis.
Cash balances	50,544.760
Accounts with head offices (credit)	14,439.573
Deposits on sight	45,308.397
Deposits on time	36,462.754

The Banco da Republica do Brazil in Rio is by far the most important of the national-banking institutions of the country and its status on the date above referred to was as follows:

ASSETS.

	Milreis.
Guarantee bonds of the reserve fund	11,219.000
Bank stock	121,631.854
Bills (discounted, receivable, etc.)	41,644.550
Debentures (Títulos) in liquidation	5,114.097
Current accounts	72,327.358
Loans	41,609.081
All other assets	329,085.581
Cash on hand	20,022.902
Total	642,654.425

LIABILITIES.

Capital	101,246.800
Reserve fund:	
Public bonds	11,219.215
Special account	6,260.863
Bills issued by the extinct Banco do Brazil	1,415.975
Bonds issued by the extinct Banco do Brazil	29,762.953
Deposits	94,543.414
All other liabilities	49,441.354
Federal treasury:	
Current account	14,344.747
Account of redemption of paper money	50,000.000
Bonds deposited—assets	284,419.102
Total	642,654.425

CHAPTER XIII.

RAILWAYS IN BRAZIL.

[By THOMAS C. DAWSON, secretary of United States legation, Rio de Janeiro, Brazil.]

There is no publication, either governmental or private, devoted to Brazilian railroads. General statistics are not gathered. Until last year there was no guide attempting to give time-tables and tariff schedules. The one that has appeared, being new, is necessarily imperfect. Reports are made by the Government railroads, and certain roads which are fiscalized by the Government are required to make reports to the minister of public works. These reports are, however, made according to no uniform system. No two of them are alike, and details given in one are lacking in others. I have attempted to collate the information given in them, adding what could be gathered from the annual reports to stockholders made by the management of individually operated roads, and the data appearing in the published reports of the different States. The last publication attempting to treat compendiously of the railroads of Brazil is a sketch which appeared in 1889, written by Fernandes Pinheiro. This and the summary of the railroads of São Paulo made by Consul Hill, of Santos (Commercial Relations, 1897, p. 805), have proved of value. Most of the statistics herein given are for the year ending December 31, 1897. In the case of a few of the more important roads, those for 1898 have been obtainable and are given.

There are now in Brazil sixty-three separately operated lines of steam railway. The length of line under traffic is 14,801 kilometers (9,197 miles), of which 1,462 kilometers (908 miles) are broad gauge (1.6 meters = 1.7 yards), 12,459 kilometers (7,742 miles) are 1-meter (1.09 yards) gauge, and 887 kilometers (551 miles) are three-fourths of a meter (four-fifths of a yard). The Government operates five lines, with a length of 2,071 kilometers (1,287 miles); the States four, with a length of 177 kilometers (110 miles); guaranteed companies, 7,382 kilometers (4,587 miles), and nonguaranteed companies, 5,171 kilometers (3,213 miles). The latter two items are only approximately accurate, owing to the complicated nature of the various national and State guaranties and the lapse of some of them. The national guaranties aggregate 4,281 kilometers (2,660 miles) under traffic. The Union and the States have constructed 3,430 kilometers (2,131 miles). Four Government lines, with a total length of 1,182 kilometers (734 miles), were leased

to companies within the last two years. Propositions for similar leases of three other Government lines are now under consideration. One State line has just been sold to the Union. Propositions to lease another to a company are now being considered by the administration of the State which owns it.

Most of the population of Brazil is scattered along the coast. The large cities are, with three exceptions, seaports. The interior is mountainous. Inland communication between the ports is difficult, and each has its tributary territory dependent for intercourse with the outside world upon it alone. The railroads are therefore divided into separate systems, each having its terminus at a different port and, except in two instances, not connected with each other.

Beginning at the most northerly port and following around the coast, the systems may be enumerated as follows:

Pará, with a single short line.

Maranhão, with one short line beginning a considerable distance up the navigable river Itapicuru, which flows into the sea at the port of Maranhão.

Camocim, a small seaport in the State of Ceará, with one line.

Fortaleza, the principal seaport of the same State, with one line.

Natal, the capital and port of Rio Grande do Norte, with one line.

Parahyba, the capital of the State of the same name, with one line.

Recife, or Pernambuco, which is the center from which six lines radiate, covering pretty well the eastern part of the State. The most southern of them connects with the next system.

Maceio, the capital and port of Alagôas, with one line.

Piranhas, a river port at the head of navigation on the Lower San Francisco. It has a line, the Paulo Affonso, which runs around the great cataracts and connects the navigable upper and lower waters of the river.

Bahia, or rather the great bay which is that city's harbor, is the center for four lines.

Caravellas, the southern port of the State of Bahia, has one line.

Victoria, the capital of Espirito Santo, has one line now under construction, which it is intended to connect with the Rio system.

Cachoeiro de Itaperim, an unimportant port at the head of small-boat navigation on the river of that name, which is in the southern part of the State of Espirito Santo. This will shortly be connected with the next, and its outlet will then cease to be by the river.

Rio de Janeiro is the center of the most extensive system. It covers the State of the same name and the southern part of Minas Geraes, and has an extent of 3,700 miles, nearly half the total mileage of the country. This system is connected at two points with the next, and the two may be considered as constituting a single system.

Santos, the chief port of the principal coffee State, São Paulo, and the city of São Paulo, the capital and largest city of the State, have an extensive system—over 2,000 miles.

Paranagua, the port of the State of Parana, has one considerable line which in the near future will be connected with the São Paulo and Rio Grande systems.

Laguna, an unimportant port in Santa Catharina, has one short line.

Porto Alegre, the capital and second port of Rio Grande do Sul, has four lines tributary to it.

Rio Grande, in the same State, Brazil's most southerly seaport, has one line, which will shortly be connected with the Porto Alegre system and ultimately with the next given.

Uruguayana, a river port on the Uruguay River, which is there the Argentina frontier, has a line isolated from the other Brazilian roads, but connected with those of the Republic of Uruguay.

HISTORICAL.

The first railroad in Brazil was opened for traffic in 1856. It ran from the head of Rio Bay to the foot of the mountain range upon the crest of which is the summer capital, Petropolis. It is now part of the Leopoldina, and has been extended up the mountain to and through Petropolis. It was called the Mauá Railway, in honor of its promoter—Evangelista de Souza, Viscount Mauá—to whom the distinction of being the pioneer of Brazilian railroad building belongs. The enterprise was private, and no subvention was given by the Government.

With this exception, the early railroads of Brazil were built with Government assistance, and very few of the railways of this country owe their origin to unaided private initiative. In 1852 the Imperial Government had passed a law providing for a guaranty of 5 per cent on the capital which might be expended on lines deemed important by the Executive, and granting other privileges, among them the right of free entry of material, the monopoly of carrying within a certain zone, the right to purchase Government lands at a nominal price, the right of organizing the company under foreign law, and that of arbitration in case of disputes with Brazilian authorities. A substantially similar system has continued in force to the present time. It was devised to induce the investment of foreign capital. Until recently, when Belgian capital has begun to be considerably employed, nearly all the railway building in Brazil was done by English companies or by the Government itself.

Under the original law of 1852 four broad-gauge lines—one from each of the four principal seaports—were begun. The Dom Pedro II, from Rio, was opened to the foot of the coast range, 30 miles, in 1858. By 1865, 83 miles had been built, but the company was at the end of its resources, and in that year it was taken over by the Government. It has since been extended by construction and purchase to the city of São Paulo and to the interior of Minas Geraes, and now has a length of 772 miles and is the most important railroad system in the country.

After the establishment of the Republic its name was changed to the "Central Railway of Brazil."

The Pernambuco line was opened to Palmares in 1859, a distance of 78 miles. It has not since been extended.

In 1860 the Bahia and San Francisco was opened to Alagoinhas, 76 miles.

In 1866 the São Paulo Railway, now the most profitable in Brazil, was opened from Santos to São Paulo and Jundiahy, 87 miles. It connects the city of São Paulo, the center of the most productive coffee region in the world and of a considerable system of railroads, with the port of Santos, and is practically the only outlet for the State.

It was soon found that narrow gauges were better adapted to Brazilian conditions and requirements than broad. These four original lines were followed by only one other broad-gauge line.

In the early seventies were built the Baturité, in the northern State of Ceará; the Conde d'Eu, in Parahyba; the Natal and Nova Cruz, in Rio Grande do Norte; the Great Western, in Pernambuco; the Central of Bahia, and the Nazareth, in Bahia. What is now the Leopoldina system in Rio and Minas was begun; the Paulista, a broad-gauge extension of the São Paulo under a separate company, was built, and the Mogyana and Soracabana systems, in the same State, were begun. At this time the Dom Pedro II was extended into the Parahyba Valley, on its way to the interior of Minas and São Paulo.

The late seventies and early eighties were the years of the greatest activity in railroad building in Brazil under the Empire. In the last ten years, since the proclamation of the Republic, about two-fifths of the mileage has been added. The country had recovered from the effects of the expensive and tedious Paraguayan war, the culture of coffee and rubber had been greatly developed and were profitable, the country enjoyed an entire freedom from revolutions and serious political disturbances, and the credit of the Government was excellent. The Bragança line in Pará was built; the Baturité was extended; the Sobral, also in Ceará, was begun; the Pernambuco Southern, the Pernambuco Central, the Paulo Affonso, the Ribeirão Bonito, and the Alagôas Central were built in the States of Pernambuco and Alagôas, nearly completing the systems as they at present exist in the northern States. The San Francisco, in Bahia, was begun, the Central of Bahia extended, and the Caravellas-Philadelphia line, in the same State, built. The Leopoldina system was increased to over 2,000 kilometers (1,243 miles), covering the State of Rio and parts of Minas and Espirito Santo. The Dom Pedro II was extended to the city of São Paulo and north into the center of Minas to the productive coffee and mining regions. Extensive branches and connecting lines for the Dom Pedro II were built, among them the Oeste de Minas, the Muzambinho, the Minas and Rio, and the Sapucahy, all in the State of Minas. The Rio Claro, the narrow-gauge extension of the Paulista; the

Bragantina, also in São Paulo; the Dona Thereza Christina, in the State of Santa Catharina; the Paranagua-Curityba line in Paraná; the Uruguayana, the Southern Brazilian and the Great Southern—all in Rio Grande do Sul—were constructed, and the Paulista, Mogyana, and Soracabana in São Paulo were greatly extended.

In 1889, just before the Republic was proclaimed, there were 8,890 kilometers (5,524 miles) of railroad in operation. At the end of 1887, the last year of the Empire for which complete statistics are available, there were 8,486 kilometers (5,273 miles) in operation, of which 2,013 kilometers (1,251 miles) belonged to the Imperial Government, 95 kilometers (59 miles) to the governments of provinces, and 6,378 kilometers (3,963 miles) to companies. Of the kilometerage owned by companies, 2,585 kilometers (1,606 miles) were guaranteed by the Empire, 1,552 kilometers (964 miles) were guaranteed by the provinces, and 2,241 kilometers (1,393 miles) had no guaranty. One thousand three hundred and sixty-six kilometers (849 miles) were broad gauge and 7,120 kilometers (4,424 miles) were narrow gauge.

In the ten years since the establishment of the Republic 5,672 kilometers (3,525 miles) have been built and put in operation, all narrow gauge except the duplication of portions of the São Paulo and the Central. These double tracks are, however, not counted in the total above given. The principal new lines are the Maranhão, the Campista, the Bello Horizonte, the Melhoramentos, the Santa Maria in Rio Grande, and the Espirito Santo Southern.

The greater part of the added mileage has been extensions of existing lines. Large additions have been made to the Mogyana, the Soracabana, the Central, the Paraná, the Baturité, the San Francisco, the Uruguayana, and the Pernambuco Southern. The larger proportion of this building took place before 1896. Since that date it has been largely discontinued, owing to the financial embarrassments of the Government and the economic crisis. In 1896, the Government was engaged in building or extending the following lines: The Baturité, the Sobral, the Pernambuco Central, the San Francisco, the Central of Brazil, and the Uruguayana; but in that year work was stopped on all of these. Besides the private roads already mentioned, work was then going on on the Muzambinho, the Oeste de Minas, the Paraná, the Sapucahy, and the Paulista. The building now going on is almost entirely in the States of São Paulo, Rio Grande do Sul, Paraná, and in Rio on the Leopoldina.

DETAILS AS TO SEPARATE LINES.

In the State of Pará there is one railroad—the Bragança—which is owned and operated by the State. Propositions for its lease to a company have been advertised for, and those received are now under consideration. The income is insignificant, amounting in 1898 to $65,000. Its operating expenses were $214,000. It runs west from

the capital 105 kilometers (65 miles) through certain colonies. Minor extensions are planned, and something has been done toward their construction. Railroads are almost a superfluity in Pará, it being the richest country in the world in navigable interior ways.

In the State of Maranhão there is also but one short line, recently built by a company under a Governmental guaranty, and operated at a small loss. It connects the navigable river Paranahyba, from a point opposite the capital of the State of Piauhy, Therezina, with the river Itapicuru, which is navigated to its mouth near the city of Maranhão. There is only one train, which runs up one day and back the next.

There are two lines in Ceará, both built by the Imperial Government on the occasion of the great drought which devastated that fertile State in the early eighties. The Sobral runs from the unimportant port of Camocim into the interior a distance of 216 kilometers (134 miles). The fare is $1.50 first class, and a train runs each way every other day. The Baturité is a more important line. It runs from Fortaleza, the capital and principal city of the State, to and beyond the town of Baturité, a famous health resort in a country which would be excellent were it not for the frequently recurring droughts. Both these lines were conducted by the Federal Government until the last two years at a loss. They are now leased to private companies. The company operating the Baturité has turned what was a deficit of $30,000 in the year 1897 into a net surplus of $45,000 for the twelve months ended April 30, 1899.

In Rio Grande do Norte there is the Natal and Nova Cruz, which extends from the capital and principal port back into a sugar district. It was built under a Governmental guaranty twenty years ago, and it was expected greatly to forward the development of the State, and soon be on a paying basis. However, the expenditures are still twice its income, and the dividends of the English stockholders are entirely derived, therefore, from the guaranty. There is one train a day each way; the fare for the 121 kilometers (75 miles) is $1.35, and the running time five and a half hours. The unprosperous condition of this line is probably largely due to the depression of the sugar industry, the principal resource in former times of that part of Brazil.

The Conde d'Eu, in the State of Parahyba, was built about the same time and has had much the same history. The deficits are, however, much smaller, and the receipts are nearly four times as great per mile. Its sea terminus is the city of Parahyba, the capital and principal port of the State.

The city of Recife, usually called by foreigners Pernambuco, is the center of six lines which cover the eastern part of the State of that name.

The Great Western, owned and operated by an English company,

is the most prosperous in the State. Notwithstanding the depressed condition of the sugar-planting industry and the great fall in the value of the Brazilian paper money, which has reduced the gold value of the income, it continues under Mr. Holt's management to pay a dividend. In 1898 its net earnings were $29,700, equivalent in Brazilian paper to 3.7 per cent of the cost of the line in *milreis*. The fare from Pernambuco to Timbauba, the northeastern terminus, is $1 first class and 60 cents second, the distance being 118 kilometers (73 miles). A short link would connect this line with the Conde d'Eu, in the State of Parahyba, and another short link would join the latter with the Natal and Nova Cruz in Rio Grande do Norte. The completion of these two links would give through rail connection from Maceio on the south to Natal on the north, uniting Recife and Parahyba as well. The former of the links has already been graded by the Government, but was abandoned in 1896. A contract has just been made by the Great Western with the Government by which the company takes over the uncompleted line and agrees to finish it within twenty months.

The oldest line in the State of Pernambuco is the Palmares broad gauge, officially known as the Recife and San Francisco. The original plan was to build it as far as the River San Francisco, at a point above the Paulo Affonso Falls. The English company stopped construction when only 125 kilometers had been built. These 78 miles cost the immense sum of $9,166,300, all of which was guaranteed at the rate of 7 per cent per annum—5 per cent by the Federal Government and 2 per cent by that of the State. In 1897 the surplus of revenue over expenses was seven-tenths of 1 per cent, so the Government had to pay nine-tenths of the total guaranty. It may be remarked in passing that the governmental guaranty to most State-aided lines in Brazil is to the effect that the net income of gross receipts over operating expenses will be equal to the percentage guaranteed. If the receipts are greater than the income, the net surplus is deducted from the amount of the guaranty, and the difference is what the Government is obligated to pay. If, on the other hand, the expenses are greater than the income, the Government does not make up this deficit. In that case the dividend received by the stockholders is the difference between the net loss on operation and the total percentage guaranteed by the Government. It would seem, therefore, that there would be no incentive for the management to do anything more than make receipts balance expenditures, unless it were possible to raise the net income to a figure higher than the amount of the guaranty. To carry out in practice an effort to make receipts and expenditures exactly balance is impossible, and the managements of roads which show deficits in their annual reports to stockholders are the objects of criticism from those stockholders. Further, at present the Government has suspended the payment of guaranties in gold, and the companies are compelled

to take bonds as the guaranties fall due. These bonds have been sold by the companies receiving them at a discount of from 13 to 26 per cent. Under the decree suspending cash payments, the arrange ment was acquiesced in by the principal banking houses dealing in Brazilian securities. It is to last three years.

In the late seventies the Government began on its own account a narrow-gauge extension of the Palmares line, the intention being to reach the River San Francisco. It has only been built as far as Garunhuns, in the southern part of the State, with a branch of 48 kilometers (30 miles) connecting with the Alagôas Central. The main line is called the Pernambuco Southern, and is 146 kilometers (91 miles) long. It is still owned and operated by the Government. In the last year for which statistics have been published the operating expenses were nearly four times the income. The total deficits the national treasury has had to meet in keeping this road in operation have been over $1,500,000. Efforts are being made to lease it.

The Pernambuco Central runs west toward the center of the State. Its length is 180 kilometers (112 miles). It was built by the Government and until recently operated by the Union. Its expenses exceeded its income, and it was lately leased to an English company.

In the State of Alagôas there is the Alagoana Central, running from Maceio, the capital and principal port, into the interior. It is 150 kilometers (93 miles) long, is owned by an English company, and its income slightly exceeds its expenditure. The Government, however, has to make up the larger proportion of the guaranty.

The Paulo Affonso begins at the head of navigation from the sea on the San Francisco River, at a point some 400 miles above its mouth. It connects the lower river with the upper around the great cataracts called Paulo Affonso. This line, which is 116 kilometers (72 miles) long, was built and is still operated by the Government. Steamers run weekly from Penedo, the port at the mouth of the river, to Piranhas, the lower terminus of the railroad, and there a train meets them. There is only this one train a week. Even so, the expenses are three times the income, for the business is insignificant. It was expected that the road would stimulate the development of the extensive and fertile San Francisco Valley by giving it an outlet to the ocean; but in the twenty years since the line was built the increase of business has been slow. The original investment of the Government in this road was $4,700,000.

There are six separately managed lines in the State of Bahia.

The first one built was from the city of Bahia itself to Alagoinhas, 123 kilometers (76 miles). It is broad gauge and was opened for traffic in 1863. A narrow-gauge branch line has since been added to Timbo, which is under the same management, although owned by a different corporation. The guaranteed capital of the main line is $8,800,000 and that of the branch $1,457,000. In 1891 the main line

made a small net income, but ever since has shown large and increasing deficits. The branch line has never paid. The dividends of the English stockholders are therefore entirely derived from the Federal guaranties of 5 per cent and the State of 2 per cent. As with Pernambuco in the case of its 2 per cent guaranty on some of the lines in that State, the State of Bahia has failed to pay this guaranty, and it has been met by the Federal Government. The depressed condition of the sugar industry and the severe droughts from which Bahia has lately suffered have doubtless greatly contributed to the poor financial results of this road, but the total results since its inauguration can not be regarded as anything but disappointing. It is the sole road entering the second city of Brazil, and the country thereabouts is, after Pernambuco, the oldest-settled region in the north of the Republic. The first-class fare from the city to Alagoinhas is $1.10 and the second-class 70 cents. During the year 1897 the total number of passengers was 291,000, all but 61,000 of whom were second-class. The population of the city of Bahia is something less than the number of passengers for the year. It will be seen how little the tastes and necessities of the inhabitants of northern Brazil lead them to avail themselves of railroad traveling.

From Alagoinhas the Federal Government opened in 1880 the first section of the narrow-gauge extension, upon which building has been in progress, with interruptions, ever since. It has now reached the San Francisco River, at the town of Joazeiro, a distance of 452 kilometers (281 miles), where it connects with the steamers which run up that river and its tributary—the Rio das Velhas—1,000 miles into the center of the State of Minas Geraes, to a point not far from the diamond district. The cost of this railroad has been $11,000,000. Except in one year, it has always been operated at a loss. The exception was 1897, when the amounts charged against the War Department for the transportation of the army and material engaged in suppressing the Canudos rebellion made the road show a credit balance. In 1894 the deficit was $89,000; in 1895, $100,000; in 1896, $109,000. The operation since 1897 shows a deficit. Propositions for the leasing of this line are now being considered by the Government. Of the several propositions submitted, one is by the State of Bahia, and another by a syndicate in which some Americans are interested.

The Santo Amaro is an old line 36 kilometers (22 miles) long, built, owned, and operated by the government of Bahia. Its expenses are more than twice its income. In the finance minister's report the expenses are given in bulk, and no income appeared at that time to have been turned over to the treasury by the management of the road. The receipts, as estimated by the previous legislature, are taken as the receipts of the year, in default of any available report in the State publications of the actual receipts. It is not improbable that the estimate was excessive, in view of the falling off of business of other

Bahia roads, and the natural optimism to be observed in governmental estimates of expected income.

The Central of Bahia is an important line owned and operated by an English company. It is guaranteed. The terminal point is on a navigable river which runs into the Bahia Harbor on the opposite side from the city. The main line runs up the Paraguassú Valley and is the sole outlet for the Bahia diamond fields. The territory produces largely of tobacco and sugar. The road seems to be economically managed, and is paying a net income in spite of the drought and the fact that it is guaranteed.

The Nazareth line also starts from the west side of the Bay of Bahia. Its territory gives it a good traffic in coffee and tobacco, and its 99 kilometers (62 miles) pay 7 per cent paper on its cost. An English company owns and operates it, and it has a guaranty.

The Caravellas line starts from the port of that name in the southern part of the State. A portion of it has been in operation since the time of the Empire. It has been considerably extended of late by the guaranteed Brazilian company which owns it. The intention is to build through the center of Minas Geraes from east to west, a region rich for agriculture and in gold and diamonds, but which has poor transportation facilities. Powerful politicians of the State of Minas are officers of the company, and the respective States through which it passes have given it a considerable guaranty.

The Southern of Espirito Santo is a State-owned road now under construction. It is really not yet opened for traffic, the 21 kilometers (13 miles) reported as laid with rail and under operation being operated principally to aid in the extension of the line. It begins at the port of Victoria and is to run nearly due west to the southwestern borders of the State. The territory is excellent for coffee, and as yet is little developed. The engineering difficulties to be encountered are considerable, as is the case with nearly all the lines near the coast in the central part of Brazil. The State finances are not in a condition to insure a prompt completion.

The Cachoeiro Railroad starts from the head of navigation on the Itapemirim River, in the southern part of Espirito Santo. It has been in operation since 1887 and penetrates a fertile coffee district. Having no connection by rail, nor a deep-water port, it has not been profitable to operate. The coffee is taken down the river in small boats, whence it has to go to Victoria or Rio in coasters, or else it is taken overland to the Leopoldina terminus. The latter road, coming up from Rio, has been built to within a few miles of Cachoeiro do Itapemirim, and when the connection is made, as is expected shortly, it would seem probable that the Cachoeiro will become part of the Leopoldino system.

The Campista is a small freight line running from the great coffee and sugar center—Campos—down to tide water at the mouth of the

Parahyba River. One of the large Brazilian steamship companies which have the monopoly of the coast trade is interested in this line. The coffee, which constitutes its principal outbound traffic, is taken by coasters to one of the great ports and there transshipped, if intended for export. The line, being in a level country, was cheaply constructed and is understood to have been directly or indirectly profitable to the builders.

The Leopoldina is the line which has the greatest extension in Brazil, including at present 2,190 kilometers (1,361 miles)—more than one-seventh the total of the country. It has been formed by the consolidation of a large number of lines, some of which were built by the then province of Rio and others by private companies, the latter being sometimes guaranteed and subventioned and sometimes not. The original Leopoldina was a short line in the southeastern part of Minas Geraes. This was consolidated with the Cantagallo line, which had been built by the province of Rio, and which runs from Nictheroy, on the opposite side of the bay from the city of Rio, through the cities of Nova Friburgo and Cantagallo, in the central part of the State, to its northern border. To these have since been added numerous lines in the eastern part of Rio, the southern part of Minas, and the western part of Espirito Santo. The financial history of the system has been a checkered one. In 1887 it was reported that the Brazilian company then owning it had made a net income of $550 per kilometer (0.6214 mile), or about 3 per cent on the cost of the 1,052 kilometers (654 miles) then included in the system. Subsequent operations were not so successful. The capitalization, bonded debts, and guaranties on the different portions of the system were very complicated.

Two years ago it was taken over by an English company incorporated for the purpose of completely reorganizing it. The plan outlined contemplates the retirement of the stock and securities of the separate lines and their substitution by stock and bonds of the new company. The legal difficulties have been very considerable and have not yet been entirely surmounted. Last year certain minority bondholders succeeded in obtaining by legal process possession of the Carangola division, one of the most valuable feeders. Lately, however, the decision of the court of appeals has been in favor of the main company. A year ago Mr. F. W. Barrow, an English manager who had been remarkably successful in the Argentine Republic, was imported; his management has been vigorous and he seems likely to earn the large salary and bonus which is to be given him if he makes the system succeed. The chief lines of which the system has been built up are as follows:

(1) The Cantagallo line in the central part of the State of Rio. Built by the Province, it was opened for traffic in the early seventies. This line is remarkable for the engineering difficulties that have been overcome in crossing the coast serra into the Parahyba Valley. The ascent has a grade of 8.3 per cent, which is said to be the steepest

track in the world up which trains go without the aid of cogs or cables.

(2) The Leopoldina proper, named after the city of this name, is in the southeast part of Minas Geraes and runs north more than 200 miles from the southern border of that State. It has a branch connecting it with the Central of Brazil, and most of the traffic of this division reaches the seaboard over the Government system. However, a link is now under construction by the new Leopoldina company from Areal, on the Gran Pará division, to Entre Rios, and this will give the Minas division an outlet over the tracks of its own system. This link will be in operation by April, 1900.

(3) The Gran Para and Norte lines form a division entirely separated from the rest of the system, up to the present. They are upon the Rio side of the harbor and serve the summer capital—Petropolis—and the stations beyond. This line is remarkable as having been the first railway to be operated in Brazil. It was put in operation in 1856 as far as the foot of the mountains, on the top of which is Petropolis. It was then but 10 miles long, its harbor terminus being reached then, as now, by ferries from Rio City and the journey from its other end being continued to Petropolis over a carriage road. The line up the mountain was finished in 1881. The cog system used to climb the 2,800 feet of ascent in less than 4 miles is remarkable and has often been described by travelers. At the foot the train is divided into sections of two light cars each, and thus the ascent is made in thirty-five minutes.

(4) The Macahé-Campos line branches from the Cantagallo near Nictheroy and runs along the coast region of Minas, through the port of Macahé, on to the important city of Campos, near the mouth of the great Parahyba River, there turning to the north and extending up into the southeastern part of Minas. This division connects with the Leopoldina proper, first described, and has several branches.

(5) The Carangola line runs north and east from Campos into good coffee districts of Espirito Santo and Minas.

(6) The Piau line connects Juiz da Fora, the principal city of southern Minas, with the main Minas-Leopoldina division.

Next to the Gran Pará, the Cantagallo is the oldest part of the system. The Leopoldina proper dates from 1872. The Cantagallo and Leopoldina proper were consolidated in the time of the Empire. January 1, 1888, the consolidated company had 1,204 kilometers (748 miles) in operation; its capital was $27,500,000; its gross receipts were $1,400,000 a year, and its expenses for operation $850,000. After the Republic the Macahé-Campos line, the Gran Pará, and other smaller branches were added; but the results were not so favorable. With the advent of the present management matters have been going better. In 1898 the net income was $326,000, and the returns of the current year will be something better.

The next railroad in geographical order is the Central of Brazil,

which is the most important in the country, having the largest income and expenditure and reaching the most populous and fertile portions of the States of Rio and Minas, connecting the two greater cities of Brazil—Rio and São Paulo—and having a large number of connecting lines as feeders, besides enjoying the advantage of a monopoly of the terminal facilities at the greatest port, and having most of the suburban traffic of a city of 750,000.

Originally, this road was known as the Dom Pedro Segundo Railway. It was begun by a company in 1857 under a governmental guaranty. In 1858 the first section of 48 kilometers (30 miles) was opened. In 1860 it reached the foot of the coast serra. The expense and difficulty of getting over the mountains were so great that it was not until 1865 that the line was completed over the range into the Parahyba Valley, a distance of only 133 kilometers (83 miles) from Rio de Janeiro, and the company was at the end of its resources. In that year the Imperial Government took it over, and work was pushed more rapidly, reaching Entre Rios, 198 kilometers (123 miles) from Rio, in 1868, and within the next few years getting over the Mantiqueira Range to the great plateau of Minas. Branches were also built down the Parahyba Valley from Entre Rios and west from Barra do Pirahy to the boundary of the State of São Paulo. On January 1, 1888, there were 786 kilometers (488 miles) in operation, all broad gauge except 61 kilometers (38 miles). Its gross receipts for 1887 were reported at $5,542,300, and its operating expenses at $3,559,200. Since the Republic, the line has been increased to a length of 1,222 kilometers (759 miles). Besides the branches already mentioned, there is one to Ouro Preto, the old capital of Minas. The main line now runs north by a narrow-gauge extension to the heart of the gold-mining region in the Upper San Francisco Valley, and the Government has acquired and incorporated with the line the narrow-gauge road built by a private company from the western end of the old Dom Pedro II to the city of São Paulo. The Rio suburban traffic has vastly increased lately.

The capital cost of this system to the Government, as nearly as it can be ascertained from the departmental reports, has been $97,300,000 gold, or $126,000 per mile. There are three tracks for 17 kilometers (10½ miles) out of Rio and a double track 4 kilometers (2⅝ miles) farther. The roadbed is in general solidly built, the rails are sufficiently heavy, the track well ballasted, the bridges and culverts are well constructed of stone or iron for the most part, the station houses and platforms are as a rule excellent, the central station at Rio is large and commodious, and the rolling stock is up to the average American standard, although perhaps the condition of repair in which it is kept leaves something to be desired. Besides the numerous suburban trains, there are seven daily trains as far as Barra do Pirahy, the junction point of the São Paulo and Minas divisions; two trains a day each way go to São Paulo; three as far as Lafayette,

the end of the broad gauge on the Minas line, two of which go through to the end of the line. To Juiz da Fora and Barbacena, the large cities of southern Minas, there are four daily trains. Good sleeping cars run on the through night trains as far as the broad gauge goes.

The passenger fares are low at present, the base rate being, at the present value of the *milreis*, only 1 cent a kilometer (0.6214 mile) first class. This rate does not include baggage.

In common with all other institutions in Brazil in receipt of incomes more or less fixed and payable in legal tender according to an already determined scale of charges, this railroad has suffered from the depreciation of the paper currency. An attempt has been made to remedy this in part by the adoption, as to certain articles of freight, of a sliding scale of rates. According to recent regulations on this subject, the published rate can only be applied when the *milreis* is worth 10d. sterling (20 cents). Every reduction of a penny in the market rate of the *milreis* raises the rate 5 per cent, and every increase reduces it by the same percentage. The same system is applied to the Leopoldina by Government regulation.

For the last several years the Central has been losing a great deal of money for the Government. The estimates made each year have shown that a small net profit was hoped for, but these expectations have not been justified by the results. The errors seem to be mostly in underestimating the expenses. In giving the receipts and expenditures of the Central it is impossible to arrive at exact accuracy by fiscal years, items of expense being, of course, carried over from one year to another. The Congressional appropriations made to cover deficits do not always show for what years the deficits were incurred.

For the last five years the receipts of the Central, as reported to the Government auditing department, the *Tribunal de Contas*, have been 141,865 *contos* ($25,535,700), and the appropriations made by Congress have been 167,021 *contos* ($30,063,780). In the earlier years of this period considerable extensions were made, and it is probable that part of the cost of them is included in the total, although an attempt has been made to separate them in making this computation. In 1898 the amount of building was very small, and the appropriations for that year would seem to be unquestionably chargeable to the operating account. The average value in United States currency of the *conto* (1,000 *milreis*) during that period has been about $180, and it has varied between $126 and $234.

The Congressional appropriations for the year 1898 were 45,601 *contos* ($8,208,180). Since other appropriations were made by the Congress lately adjourned for expenses incurred in years prior to 1897, it is possible that the appropriations made to date may not cover all the expenses that will ultimately have to be met. The apparent deficit on the year's operations was therefore 12,701 *contos* ($2,286,180), and this may be increased.

For the year 1897 the management's report gives no exact statement of expenditure, but it was estimated after the year's business was concluded at 29,192 *contos* ($5,254,560). The appropriations, original and supplementary, for the year were 32,503 *contos* ($5,850,540).

For 1895 the appropriations were 38,431 *contos* ($6,917,580), and the expenses given in the management's report were 28,012 *contos* ($5,042,160). It is evident, therefore, that items which must be met by Congress are omitted from the report. The revenue reported by the management for that year was 27,945 *contos* ($5,030,100).

The amount paid in salaries for 1894 was reported as 16,253 *contos* ($2,925,540), and that in 1895 as 19,041 *contos* ($3,427,380), the increase resulting from the advance in salaries provided for by the law of December 26, 1894.

For the current year little information is available. The amount already appropriated has been $5,341,400, and taking the estimate for the next year as the maximum receipts for the current year, the income did not exceed $4,950,000. Expenses which could not be met with the appropriations already made will, according to the precedents of former years, be met by a deficiency appropriation to be made by the next Congress. It is claimed by the Brazilian administration that a net surplus for 1899 will be shown.

As will be seen from the above, the manner in which the Central and the other Government lines are handled in connection with the rest of the national administration and accounting makes it difficult to be certain that the expenditures given in any one of the annual reports are all that have been incurred, or that their sum is the total which the road may ultimately call upon the Congress to meet. State railroads in Brazil are treated, so far as accounting goes, just as if they were purely administrative parts of the Government. The income expected from them is included in the ordinary receipts of the budget, and the expenses they are allowed to incur are voted by Congress—in many cases down to the smallest details. There is therefore a certain lack of elasticity and discretionary power on the part of the management. It is probable, for example, in the opinion of those competent to judge, that employees for whom provision is made by Congress remain on the rolls when they might be changed or relieved without injury to the operation of the road, and also that it is sometimes found advisable to increase salaries deemed to be insufficient by indirect methods. It seems evident that the system in practice tends to obscure and confuse responsibility for efficient management, as well as to make it difficult for the public to ascertain exactly the net results of the operation of the roads.

The amount of the original appropriations made by Congress at the close of 1897 and the estimate of receipts show that it was expected that the operation of the Central would yield a small profit. The Congress just adjourned found it necessary to make additional appropria-

tions amounting to $877,000, and, in fact, a complete reorganization of the Central budget was found necessary. The itemized appropriations previously made were repealed, and a lump sum was voted to cover deficiencies.

A correct general statement as to the financial results of the management of the Central is that for the last several years the expenses have exceeded the income by nearly $1,000,000 a year and that the total expenses have been greater than those estimated in the annual reports made by the management to the industry department,

The Central is not only the greatest business enterprise in Brazil, but it is also a powerful political agency. Its officials and employees are usually considered to be supporters of the administration. The renting of this great property in order to convert what is an occasion for serious loss into a producer of an income has been the subject of much discussion. Congress has authorized the Executive on several occasions to lease it, and propositions have been received. During the administration of Dr. Prudente Moraes he was obliged temporarily to retire from the Presidency on account of his health, leaving Dr. Manoel Victorino, the Vice-President, in power. One of the principal features of the programme to relieve the difficult financial situation of the Government which the latter announced and attempted to carry through during his incumbency was the disposal of the Central to foreign capitalists. The unexpectedly sudden recovery of the President and his resumption of his office interrupted the negotiations, and no move in that direction is known to have been taken since.

It is the opinion of many that the dissatisfaction of the employees over such a change and the disorganization and rearrangement of political conditions incident thereto in the States of Rio and Minas would be a serious menace to public order, should it be consummated. In addition, there is undoubtedly a large body of Brazilian opinion which believes that an enterprise of such magnitude, and so interwoven with the political and industrial organization of the country, ought not to be placed in the hands of foreigners. There is a certain apprehension among a large number of Brazilians of the effects of the preponderating influence of foreign capital. Such apprehensions have, however, not proven justified in Pernambuco, Bahia, and Rio Grande do Sul, where the railroads are mostly owned by English companies, nor in São Paulo, where they are largely so owned.

Under what is known as the funding agreement, consummated at the end of President Moraes's administration, with the consent of the incoming President—Dr. Campos Salles—the revenue of the Central is hypothecated to the Rothschilds to secure the payment of the bonds in which, by that arrangement, the interest on the foreign-held debt and the guaranties on the railroads are now being paid. But the revenues of the Rio custom-house and, in order of their importance, those

of the other ports are prior security. The Central may not be touched until they are exhausted, and, since the amount of the loan can not exceed $50,000,000, it is apparent that the Central will never be reached under the arrangement as it now exists. In case, however, that Brazil does not resume payments in 1901—the term of the funding arrangement—and it becomes advisable to renew it, there would seem to be a possibility that the Government and the London capitalists may both find it preferable to reverse the order of the security and to turn over the Central rather than the customs. But, unless the present earnest effort of the Government to restore financial equilibrium should fail and it should become necessary for Brazil to make a specific provision to meet her deferred obligations, the question can not arise in this form.

The Minas and Rio is a connecting line, 170 kilometers (106 miles) long, built and owned by a guaranteed English company. It leaves the Central at Cruzeiro and extends into one of the finest coffee sections of Brazil—southwestern Minas. It was opened in 1884 and has paid good dividends, usually 7 per cent, although this year it paid but 6 per cent, owing to the fact that the Brazilian Government stopped the payment of the guaranty in cash and paid instead in bonds, upon which the company only realized 76 per cent. In 1897 its net surplus over operating expenses was $47,000. A great advantage which this line enjoys is that it is at present the outlet over which the Muzambinho and the principal division of the Sapucahy Railroad reach the Central and the port of Rio.

The Banalense, Rezende, Valenciana, Rio das Flores, Vassourense, and Bello Horizonte are all short lines leading off from the Central. All of them are operated at a loss, and, with the exception of the last, which is owned by the State of Minas, they are the property of Brazilian companies.

The Rio d'Ouro Railroad is the property of the Government. It runs from the city of Rio in a northwesterly direction and was built to assist in supplying the city with water from the range of mountains there. Its expenses are six times its income, and it is likely to be a continuous drain upon the treasury, in the opinion of successive ministers, unless the market-garden industry along its line develops so as to give it a remunerative traffic.

The Corcovado is a cog railway running to the top of the mountain of the same name which rises in the midst of the city of Rio. It has, of course, no freight business except that connected with the resorts on the mountain.

The Minas Western, or "Oeste de Minas," is one of the longest systems in Brazil. It starts from the station of Sitio, on the main or Minas line of the Central, 363 kilometers (226 miles) from Rio, and runs west through the old mining center São João d'El Rei, 311 kilometers (193 miles), and then runs north 400 kilometers (249 miles).

The width of the gauge is but 30 inches. The first part of the line, built about 1880, received a subvention of $5,000 a kilometer from the province of Minas Geraes. Subsequently this was substituted by a 7 per cent guaranty. At present its gold bonds bearing 5 per cent are guaranteed, both principal and interest, by the Federal Government. The issue amounts to $18,000,000.

This road has now under construction a line which is to run from Barra Mansa, on the São Paulo branch of the Central, to Catalão, in the interior State of Goyaz, which as yet is entirely without railroads. This new line will have a total length of 1,440 kilometers (895 miles) and will run in a northwesterly direction, connecting with the actual east and west line of the Western Minas at its western terminus—Ribeirao Vermelho. At the beginning of 1898, 81 kilometers (50 miles) had been completed and were in operation north and south from this point, and 41 kilometers (25 miles) had been built north from Barra Mansa. For the last few years this company has been in financial difficulties, and propositions for reorganization are now being considered. The bonds are mostly held by German capitalists and are quoted at 61 per cent of par, on the strength of the Government's guaranty.

The Melhoramentos Railroad is owned by a Brazilian company. It extends from a northern suburb of Rio 165 kilometers (103 miles) in a northerly direction into the Parahiba Valley. For 60 kilometers (37 miles) it parallels the Central and then turns off to the right.

The Muzambinho is an extension of the Minas and Rio in the coffee district of southwestern Minas. It is composed of two unconnected divisions, one of which is guaranteed by the Federal Government. Expenses exceed income by about 65 per cent. The receipts are small, amounting this year to only about $160 per mile.

The Theresopolis is a short line from Rio Harbor to the foot of the mountain near the health resort of that name. It has a 6 per cent guaranty, and the company owns large tracts in and near Theresopolis. The road is at present only operated enough to hold its franchise. It can never be profitable until it has been built up the mountain to its intended terminus, which would then become a formidable rival to Petropolis, as it has a much superior climate.

Like the Muzambinho, the Sapucahy is in southwestern Minas. The original plan contemplates an extensive system with an independent terminus at Rio, approximately following the Central as far as Barra do Pirahy, where the latter crosses the Parahyba River, then leaving the Government road to the south, going west through the southern part of Minas to the border of the State of São Paulo, where it connects with the Mogyana at a point 307 kilometers (191 miles) north of Santos. The western portion of the line has been finished and runs from Baependy to the junction with the Mogyana at the frontier, crossing the Minas and Rio, which is its present principal

outlet to the seaboard at Soledade. The Mogyana also gives it a connection with the seaboard at Santos. Upon the eastern portion a considerable section has been built, extending from Barra do Pirahy to Livramento, which is the eastern terminus of the western division. At the Rio end little has been done beyond the acquiring of some rights of way and the grading of a few kilometers of roadbed. The Barra-Livramento section will not be of much use until it is pushed on to a connection with the western portion. The service on it is very meager. During the prosperous years of the last of the Empire and the first years of the Republic the Sapucahy did a considerable business, and its securities were valuable. Of late years it has been running behind badly, and it is now in the process of liquidation by judicial sale.

The great coffee State of São Paulo is well supplied with railroads, and they are the most prosperous and profitable in the Republic. They are all privately owned, and the governmental guaranties are given to only a small portion of the mileage under operation.

The key to the whole system and the most valuable railway property in Brazil is the São Paulo Railway, running from Santos to Jundiahy, through the city of São Paulo. The traffic of all the other São Paulo railroads reaches the seaboard over this line. It pays an annual dividend of over 10 per cent, and its rates on coffee, the principal commodity, are lower than those of any other railroad in Brazil. It was opened for traffic in 1868, having been built by an English Company under a guaranty, which was soon found to be needless and which has long since ceased to be availed of. The method employed in climbing the coast serra to the plateau of São Paulo is curious. The ascent of 2,600 feet is made within 8 kilometers (4.9 miles), and is divided into four planes of 2 kilometers (1.2 miles) each, up which the trains are pulled and let down by cables operated by stationary engines. The company is now engaged in duplicating its track, in order better to accommodate the large traffic. The line is broad gauge and double track and cost $150,000 per mile, including terminals. The gross income approximates $40,000 a mile for the line now in operation.

The second railroad built in São Paulo was the Paulista. In its inception it was a Brazilian enterprise, backed by the coffee planters in the State of São Paulo. The propaganda in the State for its building began shortly after the finishing of the English road to Jundiahy, during the closing years of the Paraguayan war, and was intimately connected with the formation of a party in that State, the principal programme of which was the development of agricultural and commercial industry along modern lines. In this movement were many of those São Paulo statesmen who have since been prominent in what grew to be the Republican party of Brazil, and who have furnished the two civilian Presidents of the Republic. The enterprise early

became profitable and was taken over by an English company. The main line was begun in 1872 and ran to the city of Campinas from the terminus of the São Paulo. It was broad gauge and has since been extended north to Descalvado. A few years later the Rio Claro, a narrow-gauge line connecting with the original Paulista at the town of Rio Claro, was begun. In recent years it has been incorporated with the Paulista. The Rio Claro covers the northwestern part of the settled section of the State and, built without any guaranty and by Brazilian initiative, has made a handsome profit. In 1898 the gross income was more than twice the operating expenses, and the net income was 28 per cent of the cost of the line, estimated in gold. The consolidated system has nearly 1,000 kilometers (621 miles) of track. Its net income in 1898 was $750,000, and it paid a dividend of 7½ per cent.

The third great system is the Soracabana, which is about as extensive, but all narrow gauge and in a territory not as well developed. It covers the southern part of the State, running west from the capital. Its southwestern branch is being pushed on down toward the Paraná frontier, the intention being to connect with the São Paulo and Rio Grande. The completion of the latter will give a continuous line of railway from the Rio, Minas, and São Paulo systems along the fertile plateau of Paraná and Santa Catharina into the extreme southern State of the Republic—Rio Grande do Sul. The industrial, strategical, and political results can not fail to be of the first importance. The extensions now being built by the Soracabana are guaranteed, but are operated at a small profit. There is in contemplation the building of an unguaranteed line to the port of Santos. The São Paulo Railway, which has now a monopoly of transportation by land to this port, claims that this would be a breach of the terms of the concession originally granted to it. It is asserted that the concession gave an exclusive privilege for a zone of 66 kilometers (41 miles).

The last great system of the State of São Paulo is the Mogyana. This extends from the city of Campinas, where it connects with the Paulista, along the eastern border of the State to its northern boundary at Jaguará, on the Rio Grande—a principal tributary of the Parana—and there crosses into western Minas, into which it penetrates at present a distance of 283 kilometers (176 miles). The first section of the Mogyana was opened in 1873, and in 1879 the line was extended as far as Casa Branca. In 1883 it was extended to Ribeirão Preto, the center of one of the very best coffee-producing sections of Brazil. The extension to the Rio Grande and into Minas has since been added.

At the present time only 95 kilometers (59 miles) remain to be built in order to reach the town of Catalão, in the State of Goyaz. The intention is ultimately to go to Cuyabá, the capital of Matto-Grosso, which is now accessible only by way of Buenos Ayres and the Parana

and Paraguay Rivers. The political advisability of this line is manifest. It will connect fertile regions of the Brazilian Republic now only accessible from each other by long detours through foreign countries. For this extension the Government has granted a 6 per cent guaranty upon 30 *contos* per kilometer. This amounts to $1,000 gold per kilometer per year. The road as a whole is profitable, but on the guaranteed portions, which are in a remote and as yet undeveloped country, there is a deficit.

In Paraná, there is one important and prosperous line. It was built by a French company under the direction of a Brazilian engineer, Mr. Soares, but its shares have been largely bought up in Switzerland and Belgium, and the management is now Swiss. The original line runs from the port of Paranagua to the capital of the State—Curityba. It was opened in 1883. This line surmounts the serra without the aid of cogs or cables, and the engineering is most excellent. An extension was built during 1891—1894 to the fertile interior. This joins at the station of Ponte Grossa with the São Paulo and Rio Grande line, recently opened. The Paraná main line and extension are guaranteed, but have paid an excess of receipts over expenses. In 1897 the net income amounted to nearly 6 per cent of the capital invested, estimating both on a paper basis. The Government therefore had to pay only a small proportion of the guaranty. But this road, like all the other guaranteed roads, is subject to the rigid fiscalization and immediate control of the Government. An officer called a "fiscal" watches the operations and accounting of the company in the interests of the Government. By its control of rates and in other ways the Government is enabled to enforce its views as to proper management upon the guaranteed companies. Sometimes these views do not correspond with those of the owners of the line or of the industries depending upon it for transportation. It has happened that roads wishing to build up an industry by conceding low rates have been prevented or hampered by the action of the "fiscal," taken with the purpose of increasing the immediate revenue of such lines so as to decrease the amount of guaranty which would have to be paid by the Government out of the current budget.

The transport of goods on the Paraná and on the other lines which mount to the fertile central plateau, up the steep mountain chain which borders the coast from the northern part of Rio Grande do Sul as far north as the southern part of Bahia, is necessarily expensive. There is also a limit to the amount of traffic which can be carried over a narrow-gauge up the steep grade required. At times this limit has been nearly reached in the case of the Paraná, and this fact constitutes a serious obstacle to the complete and early development of the fertile "hinterland."

The Dona Thereza Christina was built about the same time as the Paraná and by an English company. It is of small importance, and

its expenses are reported to be three times its income; consequently most of the Government guaranty is used to meet the deficit. This is the only railroad in the State of Santa Catharina. Its sea terminus is the unimportant port of Laguna. Florianopolis, the capital, and Blumenau, the seat of an old and prosperous German colony, have no connections. A concession has been granted for a line running from the latter place back to Porto da União. This town promises to be the Chicago of southern Brazil. It is at the head of navigation on the Iguassú River, a large navigable tributary of the Parana, and is the junction point of all the railway systems projected for southern Brazil, Paraguay, and northeastern Argentina. The São Paulo and Rio Grande, the trunk line between middle and southern Brazil, is already completed to within a few miles of it. A line is projected to the Paraguayan border and another to the Uruguay River, which will connect it with the railway system of that Republic.

The São Paulo and Rio Grande is the latest line to be put in operation in Brazil. In December, 1899, traffic was inaugurated on a section of 229 kilometers (142 miles) running north and south from the western terminus of the Paraná Railroad. The line is to run from the southwestern terminus of the Soracabana in São Paulo in a southwesterly direction, through the very fertile and promising region of the plateau of Parana and Santa Catharina, to the Uruguay River, which is the northern boundary of the State of Rio Grande do Sul. At this point it will connect with the Cruz Alta branch of the Uruguayana, and through it have access to the systems of Rio Grande.

The last State is already comparatively well supplied with railroads, and building is actively going on. The soil of the State is fertile, and the climate is suitable for the cultivation of all the products of the temperate zone, as well as healthful and invigorating for the northern races of men. The cattle industry is the chief one at present, but the cultivation of small grains and general farming offer opportunities.

Before the beginning of the revolutions in the thirties the culture of wheat was extensively followed. Unhappily there have been frequent political disturbances since, the last being in 1893 and 1894. Numerous German colonies have been established and are flourishing.

The oldest railroad in the State is the Porto Alegre and Novo Hamburgo, the latter, as its name indicates, being a German colony. It is 43 kilometers (27 miles) long, and its gross income during 1898 was $7,000 per mile. There was a net income on the whole line of $10,000, but this did not suffice to pay an interest equal to the governmental guaranty given to the English owners.

The next railroad put into operation was the Uruguayana. This starts from Taquary, a river port 80 kilometers (50 miles) from Porto Alegre, and extends west across the State. Its construction was undertaken by the Government for reasons primarily political and strategical, the intention being to give Brazil access through her own

[illegible] the River Uruguay in the upper part of its course. The advantages to the Government of such a road, in case of any difficulties with the countries on the River Plata, are manifest. It was begun in [illegible] and in [illegible] only [illegible] kilometers ([illegible] miles) had been built. In the early years of the Republican régime more than 100 kilometers ([illegible] miles) were built, and it now reaches more than half way across to the Uruguay. [illegible] the operating expenses constantly exceeded the income; but since that time a net income over operating expenses has been reported, being the only instance of a government road in Brazil which paid its way during that period. Two years ago it was leased by the Government to a Belgian syndicate, which has since operated it. In [illegible] a net profit of $55,[illegible] was realized. The extension west to the Uruguay is being built, and 121 additional kilometers ([illegible] miles) will soon be open. A branch connecting it by a north and south line with the Rio Grande Southern is also under construction. Two sections of this branch have been built and are in operation—one from Cacequy, the actual western terminus of the main line, southwest, and the other from Bagé, the terminus of the Rio Grande Southern, northwest. Only a short distance remains to be built to make this connection.

Branching off from the Uruguayana at the station of Santa Maria, 3[illegible] kilometers ([illegible] miles) from Porto Alegre, is the Cruz Alta, a line now under construction by the Compagnie des Chemins de Fer Sud Ouest Brésiliens. This is a company under Belgian control and intimately connected with the company which has leased and is operating the Uruguayana. The line is to run north to the upper waters of the River Uruguay, there to connect with the São Paulo and Rio Grande. Six hundred and seventy-four kilometers (419 miles) are completed or under construction. A year ago trains were being regularly run on 355 kilometers (221 miles). At the end of 1897 300 kilometers (186 miles) were under traffic and 6,281 *contos* (at present exchange equal to about $1,000,000) had been spent on construction of the line north from Cruz Alta. As this extension was 194 kilometers (121 miles) long, it will be seen that the cost of construction had not been far from the 30 *contos* ($5,400), upon which interest is guaranteed by the Government. This is the only line in Rio Grande do Sul which encounters engineering difficulties on account of mountains. Except in its northern portion the State is quite level, and the Cruz Alta is the only line which penetrates the district where begins the great mountain system of eastern Brazil. The business amounts to less than $400 a mile, but the company reports the operating expenses as less.

The Rio Grande Southern was opened in 1884. Its line runs from the city of Rio Grande do Sul, the principal port of the State, through the important city of Pelotas, to the interior in the extreme southern part of the State. It was built and is operated b[illegible] com-

pany, under a guaranty. For the last few years it has been paying a small surplus over operating expenses. This year the receipts will be something over $1,500 a mile.

The Great Southern is a road isolated from the rest of the Brazilian systems, but connected with those of the Uruguayan Republic at Quirahim, in the extreme southwest corner of Brazil, and is intended to connect with the São Paulo and Rio Grande Railroad, extending along to the valley of the Uruguay. It runs up the Uruguay River through the city of Uruguayana, the Brazilian port of entry for that region and the center of a large trade in cattle and matte. In order to secure the building of the 176 kilometers (110 miles) of line, the Government guarantees 6 per cent on a capital of $5,500,000 invested by the English company which still operates it. This interest guaranty has been the sole source of dividends, the expenses being about three times the income.

GENERAL REMARKS.

From the foregoing facts and the tables hereafter given, in addition to the conclusions adverted to in the case of particular railways, the following inferences may be drawn:

That governmentally managed railways are the least profitable in Brazil, so far as receipts and incomes determine the profitableness of railways.

That railways built with a Government guaranty are not likely to have their expenses much exceed their income.

That the guaranteeing by the Government and consequent control and fiscalization has resulted in seriously hampering various managements in their attempts to build up new industries.

That the number of passengers is small in proportion to the length of lines and size of the population, as compared with the number making use of railroads for travel in European and North American countries.

That the proportion of second-class passengers is much larger than in the United States.

That passenger fares are low.

That in the building of railroads the initiative and aid of the Government have been depended upon more than of individuals. Except in the State of São Paulo, they are virtually all Government aided. The law and custom are that a railroad may not be built without a specific concession from the Government, by which the route is defined and provisions made for very complete Government control. This control is not only exercised by general regulations, but officials are appointed who have in practice a supervision over, and a certain control of, the affairs of a particular road. Fines are imposed upon the managements, and controversies between them and the administrative departments of the Government are frequent.

According to the statistics prepared by Fernandes Pinheiro, there

were in Brazil, in 1887, 8,486 kilometers (5,273 miles) in operation, which had cost $294,000,000. The receipts for that year were $22,716,000, and expenditures for operation $15,613,000, leaving a net surplus of $7,103,000, or 2.4 per cent. The total number of passengers was 360,000,000, and the metric tons of freight transported were 2,100,000.

The 14,801 kilometers (9,197 miles) now in operation in the country have cost approximately $571,000,000. The gross income was $23,550,000 and the operating expenses $20,800,000, leaving a net income of $2,750,000, or about one-half of 1 per cent on the amount invested.

ENGINEERING DIFFICULTIES.

Since the eastern and inhabited part of Brazil presents as a rule a considerable chain of mountains rising abruptly a short distance from the coast, with an interior plateau seamed with deep and tortuous river valleys, the building and operation of railways in this country offers peculiar difficulties. The serra must be surmounted either by steep grades with many tunnels and a crooked line, as is the case on the Central, the Paraná, the Cantagallo branch of the Leopoldina, and others, or by specially adapted cog or cable systems, as on the Gran Pará branch of the Leopoldina and on the São Paulo. When the interior plateau is reached, the curves required are often of small radius and the gradients excessive. For these reasons narrow-gauge lines are found more practicable than broad-gauge ones. Except the Central, the São Paulo, and the Paulista, the only broad-gauge lines in Brazil are the two short roads in Pernambuco and Bahia, built with Government aid when railways were first inaugurated here. During the last twenty years practically all the railways built in Brazil have been narrow-gauge. Many lines have curves with radii of 80 meters (87.2 yards), and there are some as small as 40 meters (43.6 yards). Gradients of 2½ per cent are common; there are several of 3½ per cent, and in one instance as steep a rise as 8.3 per cent is employed without the aid of cogs or cables. This is on the Cantagallo branch of the Leopoldina, in the State of Rio de Janeiro.

The maximum grades of the principal roads are as follows: Baturité, 1.8; Natal and Nova Cruz, 2.5; Conde d'Eu, 2.17; Great Western, 2; Pernambuco Southern, 1.8; Alagoas Central, 2; Paulo Affonso, 3; Bahia Central, 3.3; Nazareth, 2.9; Carangola, 2.5; Macahé Campos (Leopoldina), 0.5; Central of Brazil, 2; Minas and Rio, 3; Theresopolis, 6; West of Minas, 2; São Paulo, 2; Paulista, 2; Soracabana, 2.8; Mogyana, 3; Parana, 3.3; Thereza Christina, 2; Uruguayana, 1.8; Southern Brazilian, 3; Great Southern, 2.

Rails, rolling stock, iron and steel structural material, and coal are all imported. Telegraph poles are largely of iron, as better resisting the weather. Sleepers are usually of wood obtained in the country. Sometimes iron sleepers are used. The Leopoldina is at present sub-

stituting many iron sleepers with native wooden ones. The wages paid men employed in construction and on the right of way are low as compared with the American standard. On the coast divisions of the Leopoldina from 1 to 2 *milreis* are paid section men per day. This is equal at present exchange to 21 to 28 cents a day. On interior lines the wages are still lower. On those in Minas they range from 14 to 21 cents a day. In the year 1898 the São Paulo Railway Company, in building the duplicate line up the serra, removed 582,000 cubic meters of earth, at a cost of $114,000. The cost of the projected Central Mineira line, which runs from Bello Horizonte across the high Minas plateau to a connection with the West of Minas, and which is to traverse a country offering about the average difficulties encountered in building railways in central Brazil, has been estimated as follows:

Description.	Amount.	
	Contos.	
Surveys and plans	412	$61,800
Administration during construction	139	20,850
Earthworks	7,542	1,131,300
Masonry	1,881	282,150
Superstructure of bridges	138	20,700
Permanent way	5,032	754,800
Rolling stock	1,550	232,500
Buildings	271	40,650
Total	16,959	2,543,850

A *conto* in this estimate is calculated as equal to $150.

The length of the line is 199 kilometers (124 miles).

An examination of the tables hereafter given will show that the number of employees required to operate Brazilian railroads, especially those under Government management, is very large. In this connection the following figures, taken from the official reports for the year 1897 as to the two principal railways of Brazil—the São Paulo, managed by an English company, and the Central, managed by the Government—are interesting:

Description.	Central.		São Paulo.	
Mileage	miles	772		[1] 87	
Total employees	number	13,176		1,175	
Employees per mile	do	13½		17	
Total expenditure reported	milreis	29,193,455	$4,378,868	10,312,038	$1,646,806
Expenditure for employees	do	21,478,375	3,221,756	3,668,734	550,310
Revenue per employee	do	2,306	346	18,414	2,762
Average annual payment to employee	do	1,630	245	3,548	532
Employees in general administration	number	1,318		75	
Expenditures for general administration	milreis	3,221,779	483,266	324,326	48,649
Employees in traffic department	number	3,953		350	
Salaries paid in traffic department	milreis	5,369,632	805,445	1,800,000	270,000
Employees in locomotive department	number	5,270		450	
Salaries paid in locomotive department	milreis	8,591,412	1,288,712	720,332	108,050
Mileage of passenger trains	miles	1,943,337		294,040	
Mileage of freight trains	do	1,960,455		896,422	
Employees on permanent way	number	2,635		300	
Wages paid to permanent-way employees	milreis	4,295,706	644,356	824,076	123,611
Material not fuel in locomotive department	do	2,034,006	305,101	4,492,762	673,914
Coal consumed	metric tons	157,089		36,622	

The monetary unit used in the above table—the *milreis*—was equal to 15 cents at the rate prevailing that year.

The difference in the number of employees as compared with the business done is curious, and the discrepancy is especially noticeable in the administrative department and the central offices. The Central is under the immediate control and direction of the Minister of Public Works, who is a member of the cabinet of the President.

As will be observed, the São Paulo has 21 per cent the trackage; does 71 per cent the business; incurs 35 per cent the total expenditure of the Central. Its receipts per mile of track are 312 per cent, and its expenditures 158 per cent those of the latter. The São Paulo has 40 per cent as many employees per mile of track, and the ratio of revenue earned to each employee is eight times as great as on the Government road. On the São Paulo the expense of central administration is 1½ per cent of the income, and on the Central it is 9 per cent. On the São Paulo, 75 men conduct the central administration for 173 miles of track, and on the Central 1,318 men for 772 miles, or 4.2 times as many for each mile.

PASSENGER RATES AND REGULATIONS.

It has been found impossible to obtain complete passenger statistics. In the published railroad statistical reports the total number of passengers carried is usually given and the revenue derived from the passenger service, but per-passenger-per-kilometer statistics are given in only a few cases. On three Government roads they are given as follows: Paulo Affonso, 25 *reis* (0.4 cent); San Francisco, 28 *reis* (0.45 cent); Uruguayana, 51 *reis* (0.8 cent). On three individually managed roads they are given as follows: Nazareth, 27 *reis* (0.43 cent); Alagoas Central, 33 *reis* (0.5 cent); Carangola, 45 *reis* (0.72 cent). On the São Paulo an approximate estimate is 26 *reis* (0.42 cent). These figures are for 1897 when the *reis* was worth one sixty-fourth of a cent. On the Central the rate upon which the fares are based is 70 *reis* (1.1 cents) per kilometer first class, and 50 *reis* (0.8 cent) second class. Formerly this basing rate was 100 *reis* (1.6 cents). This was equal to 2 cents a mile. Twenty per cent additional must be paid on all tickets on all railroads, whether State or privately owned, subventioned or not, as a tax to the Federal Government. This tax was increased from 10 per cent and made general in its application at the beginning of 1898. The first-class fare from Rio to Petropolis, a distance of 40 kilometers (25 miles), and over a line which, while it has the expensive climb of the serra, enjoys a regular and large suburban traffic, is a little over $1. Five-sixths of this goes to the road and one-sixth to the Government. The fare for the whole length of the West of Minas—602 kilometers (374 miles)—is $10. Thus the farthest inland point on any road in Brazil may be reached for $15, first class.

On Brazilian railroads no baggage is transported free, and a pas-

senger is allowed to take with him into the coach only a small hand-bag. The consequent necessity of dispatching baggage is annoying and expensive. On the Central the charge for 150 pounds of baggage is in general a little greater than a second-class fare and about two-thirds a first-class fare. However, the payment is in proportion to the weight.

Number of passengers in 1898.

Road.	First class.	Second class.
Central (suburban)	2,443,691	7,921,304
Central (interior)	379,258	1,335,844
Central (suburban), 1897	4,366,057	8,139,868
Central (interior), 1897	542,812	1,706,457
São Paulo	332,038	935,366
Bahia and Alagoinhas	59,350	259,407
Paulo Affonso	2,059	6,713
San Francisco	17,552	31,229
Pernambuco Central	111,276	304,179
Maranhão	2,809	2,899
Natal and Nova Cruz	4,137	16,096
Conde d'Eu	26,612	68,503
Palmares	96,559	401,242
Great Western	40,129	259,452
Alagoas Central	32,190	77,591
Bahia Central	22,670	98,686
Nazareth, 65 guaranteed kilometers (40 miles)	10,137	16,847
Corcovado, all first class	34,766	
Leopoldina proper, 381 kilometers (236 miles)	110,279	157,312
Sumidouro branch Leopoldina, 93 kilometers (58 miles)	14,714	28,099
Carangola branch Leopoldina, 223 kilometers (139 miles)	41,297	79,914
Rezende	4,255	12,214
Berra branch West of Minas, 187 kilometers (116 miles)	2,415	15,400
Rio Claro branch Paulista, 470 kilometers (292 miles)	145,018	387,044
Minas and Rio	13,392	69,648
Rio Grande Southern	94,305	83,855
Uruguayana, 10½ months, total both classes	50,832	
Muzambinho, both classes	47,800	
Mogyana, both classes	1,277,087	
Parana, both classes	103,844	
Dona Thereza Christina, both classes	14,079	
Cruz Alta, both classes	16,722	

It will be noted that the proportion of first to second class passengers is largest in the extreme southern State of Rio Grande and that the proportion generally increases as one comes from north to south. This corresponds with the condition of greater average prosperity in the south.

The great falling off in the traffic on the Central from 1897 to 1898 is probably to be explained by the increasing severity of the industrial crisis in the coffee regions of Brazil.

FREIGHT RATES.

There is the same difficulty in obtaining freight statistics. Per-ton-per-kilometer figures are virtually entirely wanting. It may be said in general that freight rates are higher in Brazil than in the United States, and, as a rule, are higher on the Government than on the private lines; but to this there are many exceptions. The Central charges $2.86 per hundred on first-class freight to Lafayette, the end of the broad gauge on the main line, 287 miles from Rio. On the Leopoldina the rate to Santa Luzia, 266 miles, is $1.76 per hundred. The São Paulo charges 11 cents a barrel on flour to the city of São

Paulo from Santos, a distance of 47 miles. The Leopoldina rate on coal to Portella, 148 miles, is $2.56 the long ton; on the Central it costs $4.37 to Serraria, 132 miles. The rates for coffee on the various railroads in São Paulo in the early part of this year were as follows (the rate is per ton per kilometer; there are 16⅔ bags in a ton, and the value of a *milreis*, or 1,000 *reis*, during that period was about 16 cents):

Road.	Rate.	
	Reis.	*Cents.*
São Paulo Railway	206	3.2
Paulista main line	288	4.6
Rio Claro branch Paulista	340	5.4
Mogyana main line	288	4.6
Mogyana extension	412	6.5
Soracabana	288	4.6
Bragantina	350	5.5
Campineira	630	10
Itatibense	1,080	17

The rate on the Central to the main coffee districts was 312 *reis* (4.9 cents) per ton per kilometer. The Leopoldina rates are higher on coffee, but negotiations have been about completed to put a lower tariff into effect on this article.

On the Central the classification which is in force is roughly as follows:

Baggage and freight sent by special order are the highest class. The base rate for this class of freight is 900 *reis* (14 cents) per kilometer per ton.

Ordinary first class includes high-priced furniture, art objects, porcelains, looking-glasses, crystal, inflammable objects, explosives, drugs, poisons, and articles needing care. The rate on these is 600 *reis* (9.6 cents).

Second class is ordinary furniture, crockery, leather, preparations of tobacco, wine, liqueurs, alcohol, and generally imported goods. The rate is 400 *reis* (6.4 cents).

Third class is coffee in grain, tobacco, refined sugar, and generally articles of export. The rate is 280 *reis* (4.4 cents).

Fourth class is salted hides and unshelled coffee, with a rate of 200 *reis* (3.2 cents).

Fifth class is wood, coal, cement; 140 *reis* (2.2 cents).

Sixth class, food products of primary necessity, salt, salted meats, etc.; 75 *reis* (1.2 cents).

Seventh class, fresh meats, minor agricultural products, lime, and building materials; 40 *reis* (0.6 cent).

To classes 1, 2, and 3 the sliding scale is applicable, and at the rates of exchange lately prevailing 15 or 20 per cent must be added.

STOCK AND BOND QUOTATIONS.

The securities of Brazilian railway companies are dealt in on the exchanges of London, Rio, Paris, and São Paulo, and to a lesser

extent at Brussels and Berlin. The latest quotations obtainable are as follows:

Stocks.

Road.	Per cent.	Road.	Per cent.
Conde d'Eu	7	Rio Clara branch Paulista	23
Natal and Nova Cruz	5	Sapucahy	¼
Great Western	6½	Valenciana	7½
Pernambuco and Palmares	61	Soracabana	17
Alagoas Central	6½	Soracabana, second issue	25
Bahia and Alagoinhas	9½	West of Minas	5½
Bahia and Alagoinhas Timbo branch	5½	Dona Thereza Christina	3½
Bahia Central	43	Porto Alegre and Nova Hamburgo	5½
Leopoldina	3½	Southern Brazilian	8
Theresopolis	¼	Great Southern	1½
Minas and Rio	11½	San Jeronymo	24
São Paulo	30½		

Bonds and debentures.

Road.	Per cent.	Road.	Per cent.
Conde d'Eu debentures, 5½ per cent	94	Santa Isabel do Rio Preto paper, 7 per cent	25
Natal and Nova Cruz bonds	90	São Paulo debenture stock, 5½ per cent	139
Great Western debenture stock	97	São Paulo debenture stock, 5 per cent	127
Great Western Extension debenture stock	88	São Paulo debenture stock, 4 per cent	105
Alagoas Central debenture stock, 6 per cent	97	Rio Claro branch Paulista debenture stock, 5 per cent	130
Alagoas Central debenture stock, 5 per cent	57	Soracabana debentures, different issues, 6 per cent	57 to 67½
Bahia Central limited 6 per cent debentures	98	Ituana branch of Soracabana debentures, 6 per cent	76
Bahia Central debenture stock, 6 per cent	83	Bragantina, 8 per cent	12½
Bahia Central debenture stock, 5 per cent	61	Mogyana debenture bonds, 5 per cent	103
Leopoldina 4 per cent debenture stock	84	Dona Thereza Christina, 5½ per cent	83
Leopoldina 6½ per cent paper	51½	Porto Allegre and Nova Hamburgo mortgage debenture stock, 6 per cent	74
Leopoldina 4 per cent paper	8	Southern Brazilian debenture stock, 6 per cent	80
Araruama branch of Leopoldina, 8 per cent	20	Great Southern debentures, one issue, 6 per cent	80
Carangola branch of Leopoldina, 5½ per cent	64	Great Southern debentures, another issue, 6 per cent	51
Rio das Flores, second issue, 4 per cent	17½	Great Southern debenture stock, permanent, 6 per cent	46
Minas and Rio debentures, 6 per cent	103		
Santa Isabel do Rio Preto gold, 6 per cent	5		

FREIGHT TONNAGE.

The following is reported as the quantity of freight transported by the various lines for which statistics are available during the year 1898:

Line.	Quantity.	Line.	Quantity.
	Metric tons.		*Metric tons.*
Maranhão	9,956	Bahia Central	56,342
Sobral	16,788	Nazareth (65 kilometers)	23,619
Baturité	36,302	Leopoldina proper (381 kilometers)	54,522
Natal and Nova Cruz	17,032	Sumidouro branch Leopoldina (93 kilometers)	4,904
Conde d'Eu	55,690	Central of Brazil	744,381
Great Western	114,538	Minas and Rio	70,724
Pernambuco Southern	70,376	São Paulo	1,331,222
Palmares	171,671	Rio Claro branch Paulista (470 kilometers)	180,574
Pernambuco Central	29,045	Uruguayana	40,496
Alagoas Central	94,737	Parana	91,111
Paulo Affonso	6,054	Mogyana	398,866
Bahia, Alagoinhas, and Timbo	104,711		
San Francisco	95,066		

GENERAL STATISTICAL TABLES.

The following table gives the steam railways of Brazil in geographical order, beginning at the north. The second column gives the name of the company or authority operating it; the third, the State in which it is situated; the fourth and fifth, the dates of the concession and the beginning of operation; and the sixth, whether the operating expenditures exceed the gross income or not.

Name of railway.	By whom operated.	State where situated.	Date of concession.	Date of opening.	Whether profitable or not.
Bragança	State of Para	Pará	1879	1885	Unprofitable.
Maranhão	Companhia General de Melhoramentos no Maranhão.	Maranhão		1894	Do.
Sobral	Brazilian lessees	Ceará	1878	1881	Do.
Baturité	do	do	1870	1875	Profitable.
Natal and Nova Cruz.	Natal and Nova Cruz Rwy. Co.	Rio Grande do Norte.	1873		Unprofitable.
Conde d'Eu	Conde d'Eu Rwy. Co.	Parahyba	1873		Do.
Itambé		Pernambuco			
Great Western	Great Western of Brazil Rwy. Co., Limited.	do	1870		Profitable.
Palmares	Recife and San Francisco Rwy. Co.	do	1852	1858	Do.
Pernambuco Southern.	Government	do	1876	1883	Unprofitable.
Pernambuco Central.	Brazilian lessees	do	1878	1881	Do.
Ribeirão Bonito	Local company	do			
Suburban lines	Local companies	do	1868	1870	Profitable.
Alagôas Central	Companhia Estrada de Ferro Central Alagoana.	Alagôas	1879		Do.
Paulo Affonso	Government	do	1878	1882	Unprofitable.
Bahia and Timbo.	Bahia and San Francisco Rwy. Co.	Bahia	1853	1863	Do.
San Francisco	Government	do	1876	1880	Do.
Santo Amaro	State of Bahia	do	1878	1883	Do.
Bahia Central	The Brazilian Central Bahia Rwy.	do	1866	1875	Profitable.
Nazareth	Companhia Tram Road de Nazareth.	do	1871	1881	Do.
Caravellas	Brazilian company	Bahia and Minas Geraes.	1880		Unprofitable.
Itaperim	Estrada de Ferro do Cachoeiro da Itaperim.	Espiritu Santo	1883	1887	Do.
Espirito Santo Southern.	State of Espiritu Santo	do		1898	Do.
Campista	Brazilian company	Rio	1890	1893	Profitable.
Leopoldina	The Leopoldina Rwy. Co., Limited.	Rio and Minas Geraes.	1852	1856	Do.
Central of Brazil	Government	Rio, São Paulo, and Minas.	1855	1858	Unprofitable.
Minas and Rio	Minas and Rio Rwy. Co., Limited.	Rio and Minas	1875	1884	Profitable.
Banalense	A Brazilian individual	Rio and São Paulo.	1880	1885	Unprofitable.
Rezende	Brazilian company	do	1872		Do.
Valenciana	Companhia Uniao Valenciana.	Rio	1876		Profitable.
Rio das Flores	Brazilian company	do	1874		Unprofitable.
Vassourense	do	do			Do.
Bello Horizonte	State of Minas Geraes	Minas	1896	1897	Do.
Rio d'Ouro	Government	Rio	1876	1877	Do.
Corcovado	Companhia Ferro Carril do Corcovada.	do	1882	1885	Do.
Oeste de Minas	Companhia Estrada de Ferro Oeste de Minas.	Minas	1873	1880	Do.
Melhoramentos	Empreza Industrial de Melhoramentos no Brazil.	Rio			Do.
Muzambinho	Companhia Estrada de Ferro de Muzambinho.	Minas			Do.
Rio Doce	Brazilian company	do			Do.
Maricá	do	Rio			Do.
Theresopolis	do	do	1880		Do.
Sapucahy	Companhia Viacao Ferrea Sapucahy.	Minas and Rio	1876		Do.
São Paulo	The São Paulo Rwy. Co.	São Paulo	1856	1866	Profitable.

Name of railway.	By whom operated.	State where situated.	Date of concession.	Date of opening.	Whether profitable or not.
Paulista	Companhia Paulista de Ferreas e Fluviaes.	São Paulo	1868	1872	Profitable.
Bragantina		do	1873	1884	Do.
Mogyana	Mogyana Rwy. and Navigation Co.	São Paulo and Minas.	1872	1878	Do.
Itatibense		São Paulo			Do.
Campineiro		do			Do.
Dumont	Dumont Coffee Estates Co.	do	1890	1892	Do.
São Paulo Coffee Estates.		do			Do.
Cantareira		do			Do.
Santos and São Vicente.		do			Do.
São Paulo and Santo Amaro.		São Paulo	1885	1887	Profitable.
Santos and Guarajá.		do		1895	Do.
Soracabana	União Soracabana e Ituana.	do	1870	1875	Do.
São Paulo and Rio Grande.	São Paulo and Rio Grande.	Paraná	1889	1899	Unprofitable.
Parana	Compagnie Générale de Chemins Fer Bresiliens.	do	1872	1883	Profitable.
Dona Thereza Christina.	Dona Thereza Christina Rwy. Co.	Santa Catharina.	1874	1881	Unprofitable.
Uruguayana	Affonso Speé a Belgian	Rio Grande do Sul	1873	1879	Profitable.
Novo Hamburgo	Porto Alegre and Nova Hamburgo Rwy. Co.	do	1869	1874	Do.
Santa Maria	Compagnie des Chemins de Fer Sud Ouest Bresiliens.	do		1894	Do.
San Jeronymo	Minas de San Jeronymo	do		1897	Do.
Southern Brazilian.	Southern Brazilian Rio Grande do Sul Co.	do	1871	1885	Do.
Great Southern	The Brazil Great Southern Rwy. Co.	do	1881		Unprofitable.

The following table gives the length, by whom built, the total cost of construction, the cost per kilometer, and the gauge of all the Brazilian railways:

Name of railroad.	Kilometers in operation.	By whom built.	Total cost of construction.		Cost per kilometer.	Gauge.
			Contos.[1]		*Contos.*	*Meters.*
Braganca	105	Province	8,524	$4,688,200	81	1
Maranhão	78	Guaranteed company	2,165	1,190,750	28	1
Sobral	216	Government	10,816	5,948,800	50	1
Baturité	288	do	15,560	8,558,000	57	1
Natal and Nova Cruz	121	Guaranteed company	7,750	4,262,500	64	1
Conde d'Eu	141	do	7,189	3,953,950	51	1
Itambé	110	Company	4,500	2,475,000	41	1
Great Western	141	English company	5,389	2,963,950	38	1
Palmares	125	Guaranteed company	16,665	9,165,750	133	1.6
Pernambuco Southern.	194	Government	21,354	11,744,700	110	1
Pernambuco Central	180	do	18,500	10,175,000	103	1
Ribeirao Bonito	26	Guaranteed company	835	459,250	32	1
Suburban lines	32	Companies	1,600	880,000	50	1
Alagoas Central	150	Guaranteed company	6,413	3,527,150	43	1
Paulo Affonso	116	Government	8,500	4,675,000	73	1
Bahia and Timbo	206	Guaranteed company	18,600	10,230,000	93	1.6 1
San Francisco	452	Government	21,000	11,550,000	47	1
Santo Amaro	36	Province	2,640	1,452,000	73	1
Bahia Central	317	Guaranteed company	13,000	7,150,000	41	1.067
Nazareth	99	do	3,140	1,727,000	32	1
Caravellas	309	do	14,600	8,030,000	45	1
Itaperim	71	do	1,760	968,000	25	1
Espiritu Santo Southern.	21	State	1,050	577,500	50	1

[1] Taking the conto at par ($550).

Name of railroad.	Kilometers in operation.	By whom built.	Total cost of construction.		Cost per kilometer.	Gauge.
			Contos.		*Contos.*	*Meters.*
Campista	40	Company	1,100	$605,000	27	1
Leopoldina	2,190	Guaranteed company	110,000	60,500,000	50	1
Central of Brazil	1,222	Government	176,689	97,178,950	137	1.6 1
Minas and Rio	170	Guaranteed company	15,495	8,522,250	91	1
Banalense	29	Company	1,991	1,095,050	68	1
Rezende	45	Guaranteed company	5,778	3,177,900	128	1
Valenciana	64	Company	1,760	968,000	28	1
Rio das Flores	53	do	6,000	3,300,000	113	1
Vassourense	8	do	168	92,400	21	1
Bello Horizonte	15	State	2,743	1,508,650	183	1
Rio d'Ouro	87	Government	2,600	1,430,000	30	1
Corcovado	4	Company	610	335,500	152	1
Oeste de Minas	856	Guaranteed company	62,000	34,100,000	72	.76
Melhoramentos	165	Company	11,000	6,050,000	67	1
Muzambinho	238	Guaranteed company	20,000	11,000,000	84	1
Rio Doce	27	do	1,200	660,000	44	1
Marica	49	Company	1,068	587,400	22	1
Theresopolis	22	Guaranteed company	2,200	1,210,000	100	1
Sapucahy	498	do	42,000	23,100,000	84	1
São Paulo	139	Company	52,667	28,966,850	379	1.6
Paulista	843	do	82,559	45,407,450	96	1.6 1
Bragantina	52	Guaranteed company	2,320	1,276,000	43	1
Mogyana	1,119	Company	53,401	29,370,550	48	1
Itatibense	23	do	500	275,000	22	1
Campineiro	44	do	1,140	627,000	26	1
Dumont	65	do	1,023	562,650	16	1
São Paulo Coffee Estates.	15	do	450	247,500	30	1
Cantareira	13	do	650	357,500	50	1
Santos and São Vicente.	16	do	450	247,500	28	1
São Paulo and Santo Amaro.	21	do	470	558,500	24	.75
Santos and Guarajá	6	do	300	165,000	50	1
Soracabana	950	do	67,771	37,274,050	71	1
São Paulo and Rio Grande.	229	Guaranteed company	13,200	7,260,000	57	1
Parana	438	do	20,700	11,385,000	47	1
Dona Thereza Christina.	117	do	5,609	3,084,950	48	1
Uruguayana	498	Government	29,608	16,284,400	59	1
Nova Hamburgo	43	Guaranteed company	2,150	1,182,500	50	1
Santa Maria	355	do	10,650	5,857,500	30	1
San Jeronymo	40	Company	1,200	660,000	30	1
Southern Brazilian	283	Guaranteed company	14,952	8,223,600	53	1
Great Southern	176	do	7,332	4,307,600	44	1
Total	14,801		1,045,089	574,798,950	71	

The cost above given is figured in *contos* of *reis* at par (1 gold *conto*=$550), the cost being reduced to a par basis when the currency in which the accounts were made was at a discount and wherever the time of the construction and consequent expense could be approximately ascertained.

The following table gives the gross income and the operating expenses of all but 20 of the roads. They are divided into the Government-managed roads, those depending on guaranties, and those without State help. The figures are for 1897 in most cases. The Baturité is given as it was under Government management and as it now is under a company. The amounts are given in *milreis*, worth that year about 16 cents.

Road.	Gross receipts.		Operating expenses.	
Government and State operated roads.	*Milreis.*		*Milreis.*	
Pernambuco Southern	647,485	$103,598	2,314,046	$370,247
San Francisco	818,408	130,945	1,386,498	221,840
Central of Brazil	32,900,000	5,264,000	45,601,000	7,313,425
Sobral	267,671	42,827	346,272	55,404
Baturité	855,566	136,891	1,033,078	165,292
Rio d'Ouro	149,115	23,858	908,241	144,199
Uruguayana	1,889,701	302,352	1,500,954	243,153
Paulo Affonso	49,984	7,997	136,452	21,732
Braganca	489,132	78,268	1,604,590	240,689
Santo Amaro	143,873	23,020	337,060	53,930
Pernambuco Central	894,705	143,153	1,020,310	163,250
Total	39,105,640	6,256,902	54,823,911	8,990,161
Receiving guaranty on whole line.				
Natal and Nova Cruz	147,543	23,607	291,905	46,705
Conde d'Eu	615,340	98,454	671,791	107,487
Palmares	1,795,885	287,352	1,679,046	268,674
Alagoas Central	664,210	106,274	575,186	92,030
Bahia and Timbo	1,302,167	208,347	1,676,496	268,239
Bahia Central	1,307,206	209,153	1,096,029	175,365
Nazareth	689,945	110,391	460,247	73,642
Minas and Rio	2,045,305	327,249	1,751,449	280,732
Muzambinho	140,265	22,442	255,832	40,933
Soracabana (146 kilometers)	457,780	73,245	391,687	62,670
Mogyana (283 kilometers)	468,806	74,999	954,702	152,752
Parana	1,726,934	276,309	1,036,324	165,812
Thereza	129,968	20,746	370,829	59,333
Santa Maria	494,781	79,165	444,328	71,092
Nova Hamburgo	398,384	63,741	370,300	59,245
Southern Brazilian	1,513,317	242,131	1,406,157	224,985
Great Southern	143,215	22,914	374,317	59,895
Bragantina	389,146	62,284	372,100	59,536
Total	14,429,897	2,308,783	14,178,725	2,268,596
Lines receiving no guaranty, or only on part of line.				
Baturité (1898 and 1899)	1,490,287	238,446	850,498	136,080
Great Western	1,369,061	219,056	1,135,540	181,686
Leopoldina	18,441,600	2,951,901	16,224,800	2,595,968
Valenciana	286,985	45,918	283,855	45,417
São Paulo	21,636,819	3,461,901	10,312,088	1,649,926
Paulista	24,342,000	3,894,720	10,583,060	1,693,386
Corcovado	43,606	6,977	64,858	10,337
Mogyana	15,806,094	2,528,975	10,221,996	1,635,519
Soracabana	8,848,129	1,415,701	4,751,488	760,231
Itatibense	199,597	31,936	135,169	21,627
Campineiro	306,649	49,064	302,790	48,444
São Paulo and Santo Amaro	112,247	17,960	109,275	17,840
Santos and São Vicente	232,835	37,254	160,510	25,682
Total	93,115,909	14,898,545	55,136,427	8,822,182

As to the West of Minas, Sapucahy, and 18 other roads, statistics of receipts and expenses are not available. From the best sources of information obtainable it may be estimated that the former amounted to 8,233,341 and the latter to 10,558,366 *milreis*.

In the table given above the figures are in most cases for 1897. Where they were not available for that year, those for 1898 were used, and in two cases those for 1896.

The total income of all Brazilian railways as thus given was 150,057,830 *milreis* ($24,009,253) and the operating expenses 132,501,244 *milreis* ($21,200,199), leaving a net income of 17,556,586 *milreis* ($2,809,054). This sum at the average rate for the year was equivalent to 5,016 *contos* gold, which is about one-half of 1 per cent on the 1,031,889 *contos* invested in the railways of Brazil. It should

be noted that Brazil was suffering from severe industrial depression, the price of coffee was extraordinarily low, and business in general not active. With a return of prosperity and a rise in coffee, better results may be expected.

The following table gives certain information as to the number of employees and the salaries paid them on the roads where the facts are reported:

Name.	Number of employees.	Employees per mile.	Earnings per employee.	Salaries paid for central administration.	Total salaries paid.	Gross income.
Government-managed roads.			*Milreis.*	*Milreis.*	*Milreis.*	*Milreis.*
Central of Brazil	13,176	17	2,306	3,221,779	21,478,529	30,386,375
Baturité	2,219	12.5	386	81,530	730,366	855,586
Rio d'Ouro	1,315	24.3	113	77,328	822,625	149,115
Uruguayana	4,500	14.5	439	144,173	1,201,135	1,977,561
Paulo Affonso	450	6.1	111	20,890	114,974	49,984
Sobral	1,080	8	248	38,860	242,703	267,671
Pernambuco Central	1,591	14.2	562	44,007	839,675	894,705
San Francisco	3,609	12.8	223	93,672	910,254	804,789
Guaranty on whole of line.						
Conde d'Eu	1,250	14.2	492	64,888	660,280	615,340
Palmares	1,620	27	1,109	34,385	1,541,750	1,795,885
Alagoas Central	1,126	12	590	86,152	455,791	664,210
Bahia and Timbo	1,363	10.6	954	111,821	925,410	1,300,167
Bahia Central	2,480	12.6	527	86,835	600,505	1,307,206
Nazareth	980	15.9	704	50,748	262,109	689,945
Minas and Rio	2,115	19.9	967	80,356	789,116	2,045,305
Muzambinho	598	12.7	235	32,834	168,378	140,265
Soracabana (146 kilometers)	542	5.9	844	99,907	278,387	457,780
Mogyana (283 kilometers)	2,891	16.4	162	40,272	506,361	468,806
Parana	1,180	17.1	1,164	53,839	491,613	1,726,934
Thereza	582	8.1	223	29,019	253,187	129,668
Santa Maria	1,162	6.2	426	40,786	303,299	494,781
Southern Brazilian	2,116	12	715	69,387	615,150	1,513,317
Great Southern	1,192	10.9	120	31,108	231,777	143,215
Not depending on guaranty.						
Great Western	1,560	17.7	878	118,602	1,027,388	1,368,958
Valenciana	198	4.9	1,449	21,773	191,724	288,985
Corcovado	56	23.3	779	5,512	52,902	43,606
Rio Claro (part of Paulista)	2,715	9.3	1,885	75,744	1,087,676	5,119,083
Mogyana				549,425		
São Paulo	1,175	13.6	18,414	324,326	3,668,734	21,696,819

NOTE.—The monetary unit is the milreis, worth at present about 16 cents.

CHAPTER XIV.

OTHER MEANS OF COMMUNICATION.

Besides railways and good wagon roads, Brazil has a large interior traffic by water, and also telegraphic, telephonic, mail, and cable communication.

The immense watershed of the Amazon and its numberless tributaries would afford better transit facilities but for the many obstacles found due to either the precipitous course of some rivers or their shallow waters. With the exception of the Amazon and the Paraguay rivers, which afford uninterrupted navigation throughout their whole length, the other water courses are either partly navigable in the lowlands or not navigable at all.

Steam navigation on the Amazon began as early as 1852, but it was not until July 30, 1867, when the Brazilian Government opened up the river to all nations, that its development began, and now steamers navigate the following distances on the Amazon and its principal affluents:

From Belém (Pará) to Manáos, 1,100 miles; Manáos to Iquitos, Peru, by river Solimões, 1,350 miles; Manáos to Santa Isabel, by river Negro, 470 miles; Manáos to Hyutanaham, by river Purús, 1,080 miles; Manáos to Santo Antonio, by river Madeira, 470 miles; Belém to Bayão, by river Tocantins, 156 miles; Leopoldina to Santa Maria, 570 miles, making a total of 5,196 miles of steam navigation on the Amazon and its southern affluents; and this total does not include the navigation of the branches of the above-named rivers, which would increase the amount by some 3,000 miles more.

The great São Francisco River beyond the Paulo Affonso Falls is navigated for hundreds of miles by small steamers, and by larger vessels from its mouth to the falls. A remarkable feature of the river system of Brazil is the commingling of the head waters of the affluents, which will admit passage by boats from one to the other by cutting short canals, and in many cases this could be done without the necessity of locks between their sources. The Paraná is navigable by large steamers up to the Falls of Guayrá, on the western border of the State of Paraná, and above the falls for a distance of about 700 miles by smaller vessels.

At the present time the greater part of the steamship service throughout the Amazon region, which includes Bolivia, Peru, Ecuador, Colombia, and Brazil, is done by the vessels of the Amazon Steam Navigation Company, Limited, an English corporation whose headquarters are in

London. This company was established in 1853, with a capital of £625,000, and in 1872 was consolidated with the Amazon Commercial and Navigation Company, organized at Rio de Janeiro in 1852, with a capital of 4,000 *contos*. In 1874 the Pará Fluvial Company and the Upper Amazon Fluvial Company, both receiving subsidies from the Government, were joined to the Amazon Steam Navigation Company, which enjoys at present from the Federal Government and that of the States of Amazonas and Pará an annual subsidy of 468 *contos de reis*. The number of vessels doing service in 1897 was 29, of 9,184 tons. The last report of this company shows that the net income of the company for 1899 was almost double that for the preceding year, being 1,417 *contos* for 1899 against 709 for 1898. The company has increased its fleet, its reserve fund to £60,000, and the insurance fund to $100,000.

The steamers of this company make regular trips, according to schedule, between the principal river ports of the country on the Amazon, Rio Negro, Purús, Madeira, Tapajoz, Pará, Juruá, around the island of Marajó, and through other rivers.

In addition to these regular trips, extra trips are made when the needs of commerce and the transportation of passengers require it. By agreement with the trans-Atlantic companies, Booth & Co. and Singlehurst & Co., the Amazon Navigation Company transports as far as Iquitos (Perú) with a single bill of lading all merchandise coming from Europe and the United States. At present it requires only eleven days by steamer to make the trip from Pará to Perú, while sailing vessels require eighty-six days going and forty-seven returning. Steamers ascend the Madeira as far as the Falls of Santo Antonio, and beyond this point to Matto Grosso, a distance of 1,800 kilometers. The distance between Belem and Matto Grosso is 4,610 kilometers, and one hundred and forty days are required to make the trip. Steamers ply the Javary and Juruá rivers as far as Lake Marary, and the Purús is navigated for a distance of 2,300 kilometers and the Rio Negro for 792 kilometers.

The Pará and Amazon Company has a regular steamship service on the Purús, Madeira, Amazonas, Juruá, and Javary rivers. This company was established at Belem in 1883 with a capital of 1,500 *contos*, which in 1889 was reduced to about half that sum. It receives from the State of Pará an annual subsidy of 48 *contos* and is obliged to make a monthly trip from Belem to Santa Julia. In 1893 this company had a fleet of 7 vessels.

Other trips are made from Belem to Óbidos and Juruty, touching at Faro; from Belem to Chaves, touching at Marajó-Assú; from Belem to Porto Grande on the Guamá and Capim rivers; from Belem to the Acará River; from Belem on the Mojú as far as Cairary; from Belem to Arary and Condeixa on the Camará River in the island of Marajó; from Belem to Marapinim (coast line); from Belem to Vigía, Cintra,

Bragança, and Vizen, by the Maranhão Company; and lastly trips made by the Marajó Company from Belem to Amapá on the Araguary River, touching at Macapá.

The Navigation Company of the Guamá and Tocantins rivers sends its vessels on the lower Tocantins as far as Alcobaça, 500 kilometers from its mouth. The Maranhão Coast Company receives a subsidy from the State of Pará for navigation along the coast between Belem and São Luiz, in which it employs 5 vessels of 2,278 tons. We have already mentioned that the Lloyd Brazileiro receives a subsidy for the river and coastwise navigation of Brazil. The Railway and Navigation Company of the Tocantins and Araguaya, having a capital of 20,000 *contos*, has under consideration the construction of a railway in order to avoid the dangerous falls of the river.

The navigation companies Lloyd Brazileiro, Maranhense, and Pernambucana, engaged in the coastwise trade, are subsidized by the Government. The Lloyd Brazileiro has 5 lines, called, respectively, North, South, Intermediary, Espiritu Santo and Cannavieiras, and Bahia. The first or northern line is under contract to make 60 trips between 12 ports, and receives an annual subsidy of 613,200 *milreis;* the southern line makes 49 trips between 9 ports, receiving a subsidy of 216,000 *milreis;* the intermediary line makes 12 trips to the same ports of the southern line, besides 3 more ports, and receives a subsidy of 198,000 *milreis;* the Espiritu Santo and Cannavieiras lines are under obligations to made 36 trips, as provided in their respective contracts, for which a subsidy of 139,000 *milreis* was paid until December 31, 1897. The lines of the Companhia Pernambucana receive 140,040 *milreis* per annum for 60 trips as scheduled, and the Companhia de Maranhão, 200,000 *milreis* for 84 trips as agreed upon.

The subsidized companies engaged in the river and internal navigation are the Lloyd Brazileiro, which ply between Brazilian and Argentine Republic ports, and receive 567,000 *milreis* per annum; the Amazon Steam Navigation, 360,681 *milreis;* Pernambucana, 56,200 *milreis;* Tocantins and Araguaya, 30,000 *milreis;* Parnahyba, 48,000 *milreis;* Viação do Brazil, 150,000 *milreis*, and Navegação Iterna de Matto Grosso, 15,000 *milreis.*

The principal trans-Atlantic companies are as follows: The Red Cross Line (English), plying between Liverpool and Manáos, via Havre, Lisbon, Pará, Parintins, and Itacoatiára, and between New York and the northern ports of Brazil, namely, Pará, Maranhão, Ceará, and Manáos. This company receives an annual subsidy of 48 *contos* from the State of Amazonas for the line between New York and Manáos.

The Ligure Braziliana established some time ago a service between Genova and Belem, Óbidos, and Manáos, touching at Marseilles, Barcelona, Lisbon, and the Azores. It has two splendid vessels, the *Re Umberto* and the *Maranhão*, of 5,000 tons each.

The Brooks Steamship Company, Limited, from New York to Pará, Manáos, Maranhão, Ceará, and northern Brazilian ports.

The Prince Line, from New York to Pernambuco, Rio de Janeiro, Santos, and Bahia.

The Brazil and River Plate steamers (Lamport & Holt Line), from New York and other United States ports occasionally to Pernambuco, Bahia, Rio de Janeiro, Santos, Rio Grande do Sul, and other Brazilian ports.

The Robert Sloman's United States and Brazil Line, from New York and occasionally other United States ports to Pernambuco, Maceio, Victoria, Rio de Janeiro, Santos, and Rio Grande do Sul.

Other lines connecting Brazil with European ports are Norddeutscher Lloyd, Societé Générale de Transports Maritimes, La Veloce, Royal Mail Steam Packet Company, Navigazione Generale Italiana, Harrison Line, Liverpool and North Brazil Mail Steamers, Messageries Maritimes, Chargeurs Reunis, Mala Real Portugueza, and Hamburg-Südamerikanische Dampfschiffarts Gesellschaft.

The telegraph system of the country is under the control of the Government. In 1895[1] there were 10,143 miles of line, 21,936 miles of wire, and 289 telegraph offices. The number of messages was 1,283,695; the receipts estimated at 3,600,000 *milreis* and the expenditures at 9,844,722 *milreis*.

In 1898 the extent of the telegraph lines in Brazil was 19,717 kilometers, having 39,637 kilometers of wire. The stations numbered 370. The number of messages sent were 1,266,291, and the total receipts, including taxes, amounted to 7,088,341 *milreis*.

Mail service is efficient and frequent, both as regards foreign and domestic mails. Brazil is a member of the Universal Postal Union, and has signed postal conventions with several countries, including the United States.

The number of pieces of mail matter of all classes passing through the post-offices of Brazil were estimated in 1897 at 87,309,817, and at 80,781,794 in 1898. The money orders issued in 1898 were as follows: Domestic to the amount of 7,582,243 *milreis*, and foreign 30,674 *milreis*.

Telephone service is also established in the country, which is in communication by cable with the rest of the world.

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[1] Statesman's Yearbook, 1900.

CHAPTER XV.

IMMIGRATION AND COLONIZATION.

The future of Brazil may be said to depend upon foreign immigration, which is not yet entirely voluntary, and occasions expenses to the Government in order to encourage its steady movement. For a time the General Government paid the expenses of introducing immigrants, but at present every State of the Brazilian Union attends to this particular branch of its progress. The largest part of the voluntary immigration is the Portuguese, who locate in the cities and engage in commerce, the minor industries, and trades. The greater part of the paid immigration is by Italians, whose number, exclusive of their descendants, is already 600,000, and is continually increasing. The Italian immigrants prefer São Paulo. The German colonists, whose number is less than half that of the Italians, have chosen the States farthest south—Santa Catharina and Rio Grande do Sul. The other immigration elements consist of Spaniards, Poles, Syrians, and other nationalties, as may be seen from the following table of immigrants landed at Rio in 1891, which is the year of largest immigration, the number of immigrants amounting to 191,151, exclusive of the 86,654 entered at São Paulo:

Italians	116,000
Portuguese	30,071
Spaniards	18,668
Poles and Russians	11,598
Germans	4,377
Austrians	2,883
Scandinavians	1,847
English	1,933
French	1,309
Turks	863
Belgians	378
Swiss	198
Other nationalities	439

During the five preceding years the immigration movement was as follows:

1886	25,741
1887	34,990
1888	131,745
1889	65,187
1890	107,100

The immigration movement of the subsequent four years was as follows:

1892 (year of the cholera in Europe)	86,213
1893	123,926
1894 (revolt of the navy)	63,294
1895	164,371

These ten years represent a total immigration of 1,019,226, which shows that Brazil receives a larger number of immigrants in proportion to her population than the United States with its half a million annually. Of the 164,371 who immigrated to Brazil in 1895, 91,773 entered at the port of Rio de Janeiro in 378 vessels from Europe and Buenos Ayres under the following flags: French, 129; Italian, 89; English, 86; German, 70; Brazilian, 2; Portuguese, 1; Argentine, 1.

The immigrants were of the following nationalities: Italians, 48,814; Portuguese, 24,111; Austrians, 9,391; Spaniards, 5,806; Syrians (Turks), 1,782; Germans, 971; French, 286; Russians, 269; Swiss, 93; English, 28; Belgians, 28; Americans, 27; Danes, 25; other nationalities, 142.

Of these, 31,924 were voluntary immigrants and 59,849 were brought into the country at the expense of the Federal Government and of the State of Minas Geraes.

The latest available report of the Secretary of Industry, Communication, and Public Works of Brazil for 1899[1] states that since the respective States have full charge of the service of immigration and colonization the Union continues to attend to the necessities of the voluntary immigrants, to whom free transportation is granted to any place in the Republic they should select. These immigrants are cared for gratis at the depot called Hospedaria da Ilha das Flôres, where they remain only the necessary time to receive their baggage and select their points of destination, leaving for them without delay.

During the year 1899, according to the same authority, there arrived at the port of Rio de Janeiro 386 vessels with 27,650 immigrants, the largest portion—27,531—from Europe, 43 from Argentine, and 76 from North America.

The immigrant finds in Brazil every facility for location. The provisional government even erased from the Brazilian statutes all provisions in regard to contract labor, a restriction which hurt the immigration movement. Under the name of General Board of Inspection of Lands and Colonization, annexed to the Department of Industry, Communication, and Public Works, the Government created in Rio and the various States a Board of Immigration empowered to receive and locate the immigrants, who, on their arrival, are lodged in houses built for this purpose. There they are furnished with information in regard to the situation of the centers of coloniza-

[1] Relatorio do Ministro de Estado dos Negocios da Industria, Viação e Obras Públicas, Rio de Janeiro, 1899.

tion, labor conditions of each State, means of transportation, price of lands, local markets, etc.

On obtaining this information the newly arrived immigrant chooses the location he desires, and is given free transportation, together with his baggage, to his place of destination. When the immigration service was given over to the States the contract made in 1892 with the Metropolitan Company for the introduction into Brazil within ten years of 1,000,000 immigrants was annulled. That organization, with its favors and guaranties, continues to exist, however, and already a number of the States, such as São Paulo, Minas Geraes, Espirito Santo, and Rio de Janeiro, have their immigration service completely organized. An agricultural immigrant can buy a lot of ground, establish himself upon it, and presently become the owner; or he may establish himself in a colonization center belonging to a private company or bank or in one belonging to the State, or he may hire out as a laborer. Immigrants may acquire 15 hectares of uncultivated land that is irrigated and abounding in timber and 5 hectares if half the land is under cultivation. These lots are put in communication with the existing public highway or that in course of construction by other roads, and each lot contains a small house worth 200,000 *reis*, constructed in accordance with the plan approved by the Government. Lots of uncultivated land are sold at the maximum price of 25,000 *reis* per hectare and cultivated lands at 50,000 *reis* per hectare. The immigrant is given ten years, counting from the second year of his occupation, in which to make the payments. As soon as the payments due from the immigrant have been concluded the provisional title is exchanged for another of a definite character.

Agricultural implements, tools, seeds, and whatever else he may need are advanced to the immigrant. If the immigrant lacks means he is employed in the colony to build roads and dwellings, clear and till the land. Repatriation is granted to widows and orphans who shall have lost their husbands or parents within one year after their arrival in the ports of Brazil and to immigrants who shall be disabled in consequence of some accident incurred in the service in which they shall be engaged, provided they have not yet resided one year in the Republic. In addition to the repatriation, pecuniary assistance is given in certain cases. As has been stated, the States follow the same plan, with slight changes, of concessions to immigrants.

The first attempts at foreign colonization in Brazil were due to King John VI, who, in 1818 and 1819, established the colonies of *São Jorge das Ilhas* and of *Leopoldina*, in Bahia, and the colony of *Nova Friburgo*, in Rio de Janeiro, the first with German colonists and the last two with Swiss. Since then the tide of immigration to Brazil has continued to swell, as we have seen, and that prosperity has crowned the labors of the immigrants is testified to by the fact that representatives of foreign countries, such as Mr. De Grelle, Belgian minis-

ter, and Dr. Kranel, minister from Germany, and impartial observers have written upon the flourishing conditions of the colonial centers. European colonization has been advantageous to the immigrant, to the country he comes to settle, and to the mother country, not only because of the savings he brings on his return, but also on account of the development of commercial relations which logically follows the establishment of colonies. Trade between Brazil and Germany has increased fourfold since 1865, and trade with Italy increases every day.

Among the most prosperous colonies in Brazil are the German colonies of the State of Santa Catharina, which are described as follows in an American Consular Report:[1]

"The three German colonies in the north of the State constitute its most important element; and as they afford an excellent field, commercially and industrially, for American enterprise, I will give some details concerning them.

"The oldest one is the colony of Dona Francisca, which was established directly through the influence of the former Emperor Dom Pedro II, in the year 1851, on the land which was given his daughter on the date of her marriage with the Prince Joinville. The first immigrants came in 1851—118 German and Swiss from Hamburg and 74 Norwegians from Rio de Janeiro. Although not very favorably situated in the rather low and not too fertile plain, the colony developed fairly until the Van der Heyde law of 1859, prohibiting Prussian immigration to Brazil, was promulgated. This of course retarded German immigration largely, and the hopes of the founders of this colony, the Hamburg South American Colonization Company, to make it a paying venture, were not realized. By 1885 the colony counted about 22,000 inhabitants and has to-day probably 30,000—almost all Germans, with a very few natives of the poorest class.

"The colony of Dona Francisca constitutes now three separate municipalities—Joinville, Campo Alegre, and São Bento. The Germans living there are nearly all Brazilian citizens, probably 400 being yet subjects of the German Empire.

"In the year 1897 the above-named Hamburg Company bought another large tract of land from the Brazilian Government, about 1,000,000 acres, adjoining Joinville and reaching south to the other great German colony of Blumenau. This land is much better than that of the old colony, and the cost was about 10 cents per acre.

"The colony of Blumenau was established in the year 1850 by a Dr. Blumenau, who had immigrated there from Braunschweig, Germany. He came here with 17 associates, who received very considerable subsidies from the Brazilian Government. They could not have selected a spot more suitable for colonization anywhere in the southern part of Brazil. It lies in latitude 26° 55′ 16″ south, and longitude west

[1] Commercial Relations of the United States, 1899, Vol. I, pp. 627-629.

from Greenwich 45° 15′, on the navigable river of Itajahy, in a most fertile country, and has a very favorable climate. The colony numbers at the present time probably 50,000 inhabitants, nearly all of whom are well to do. To a stranger coming here from North America they can not fail to give a very peculiar impression, for this colony, as well as that of Joinville, represents a very remarkable case of arrested development and is like a reproduction of an old German village in a former century. Being so far removed from their "fatherland," and so little in touch with the natives of their adopted country, they are isolated, thrown almost entirely upon their own resources, and thus at the end of this century they live the primitive life characteristic of the age before steam was invented or electricity thought of.

"The city of Blumenau is clean and substantial. There are no railroads, no gas, no electricity, no horse cars, and the streets are not even lighted in the evening. The vehicles which serve for transportation of persons and merchandise are, with a few exceptions, of the most primitive order. Thus it happens that the abundant products of this community can be brought to market only with greatest difficulty, and have, consequently, very little value.

"The resources of Blumenau and of the plateau back of it would warrant the construction of railroads (narrow gauge) throughout this country. Numerous concessions have been given for these, but as yet the good burghers of that colony have not succeeded in inspiring any foreigner with interest and enthusiasm enough to make use of them and build the railroads, which would certainly be very profitable, and bring this State at once to the front rank of the Brazilian Union.

"The township of Blumenau could easily support 1,000,000 inhabitants. The increase of population will commence to be rapid when once the system of transportation to which they are entitled is established. Until recently the good people of the northern part of Santa Catharina had been almost forgotten and ignored by the rest of the civilized world, but now they are attracting a good deal of attention, and they certainly deserve it. They were highly successful in making up by natural increase of population what they failed to get by immigration, the number of offspring being often surprising; families of from 15 to 20 children are almost the rule.

"As long as the colonists had to struggle against heavy odds and the overwhelming tropical growth of the virgin forests, and had no means at their disposal, the colony lacked institutions of culture and learning. Now, however, they have not less than 9 Protestant and 7 Catholic churches; 70 private schools, with 1,250 pupils, and recently they are in a position to enjoy the chances of instruction in the language of the country, which was heretofore denied to them. As a consequence of these conditions, you meet people whose grandfathers immigrated into this State, but who could not speak even the sim-

plest sentence in the language of the country. In 1892 the order of Franciscan monks established a convent in Blumenau, connecting with it a high school and an industrial school, which is very successful in affording the natives opportunity to learn the trades and to instruct themselves in the higher sciences. The institution counts now 40 regularly ordained brothers of the order (of whom 9 are priests), 20 lay brothers, and 14 clerical students, and is at present under the leadership of Rev. Father Herculano. They have planing mills, carpenter shops, sawmills, steam flour mills, blacksmith shops, tailor shops, shoe shops, painting establishments, etc., where they work for the colonists and at the same time instruct the apprentices in the respective trades. Pater Herculano intends to resign his position this year, in order to devote himself exclusively to the civilization of the neighboring Indians (the Botucodos), a very low, cruel, and ignorant tribe, which has heretofore baffled all efforts in that direction.

"Another well-known and prosperous German colony is that of Brusque, which has quite a lively trade and a population of about 10,000."

The report of the secretary of industry already quoted states that in order to further colonization the Government has entered into contracts with several private individuals and corporations. At the date of the report there were 32 of these contracts in force.

CHAPTER XVI.

EDUCATION, LITERATURE, FINE ARTS, RELIGION.

During the three centuries of colonial rule Brazil made but little progress in the general education of the people, and few schools existed except the Jesuit colleges, while there were few libraries or books except those belonging to private individuals. The wealthy classes went to Portugal to study medicine, law, divinity, and other branches of learning, while the mass of the people remained ignorant. The establishment of the Portuguese court at Rio de Janeiro in 1807 was marked by an increase in literary activity, and when King John VI returned to Portugal in 1821, he left to Brazil his historical library, which became the nucleus of the now large public library at Rio.

With the declaration of independence in 1822 the aspirations for a development in intellectual life became apparent, and a decree was issued in 1823 authorizing any citizen to establish private schools without previous special license or authority, the Lancasterian system being then introduced. The clergy and the Jesuits had had until then almost full control of the elementary education. The establishment of public primary schools in all the cities, towns, and most populous places in Brazil was authorized by a law passed in 1827. Notwithstanding these seemingly favorable conditions, the system was so crude and imperfect that no progress worthy of notice was made until 1854, when the school system was thoroughly reorganized. From that time on progress has been made in the development of education, literature, and science.

Congress is empowered by the provisions of the Constitution to promote in the country the development of literature, arts, and sciences; has the sole power to create institutions of higher instruction and secondary or high-school education throughout the Republic, and primary schools in the Federal District. As provided by the Constitution, instruction given in public institutions shall be secular, and that all laws not declaredly revoked shall remain in force, and among these there is one which provides that primary instruction shall be gratuitous and at the expense of the several States and municipalities.

Primary education is compulsory in some States, and in most of them, even those least populous and farther removed from the capital, efforts have been made to establish this system of education, which will undoubtedly develop successfully. Lack of communication facilities and vastly depopulated areas are the main obstacles to

the rapid and successful establishment of education in the interior towns.

Owing to the above circumstances the educational condition of the country varies between two extremes, from the highest intellectual culture in the great cities to the greatest illiteracy in the remote districts of the Republic. In the higher schools and educational institutions special attention is devoted to instruction in modern languages, so that all educated Brazilians, besides their own language, the Portuguese, speak French and have at least a fair knowledge of English. The Government is devoting all its efforts to encourage the education of the masses, and while some of the schools in the rural districts far from the principal centers of population are not as good as those in the largest cities, the plan of studies in use by the primary schools of the Federal District is a fair exponent of the excellent standard established.

The primary schools are divided into first and second grade schools. Pupils from 7 to 13 years of age are admitted to the former and boys from 13 to 15 to the latter. There also exist separate schools for girls, who are admitted to the first grade at the age of 8 years.

The course of study in the first grade consists of reading and writing the Portuguese language, elementary arithmetic, metric system; elements of geography and history, especially of Brazil; elements of physical science and natural history, moral and civic instruction, drawing; elements of music, gymnastic and military exercises, manual training for boys, needlework for girls, and practical ideas on surveying. The plan of education is divided into three courses, elementary, intermediate, and higher primary education. In the second grade the studies are also divided into three courses, embracing penmanship, Portuguese, elements of the French language, higher arithmetic, elementary algebra, geometry, and trigonometry, geography and history, particularly of Brazil; elements of physical sciences and natural history as applied to industries, agriculture, and hygiene; elementary principles of national law and political economy; ornamental, mechanical, and topographical drawing; music, gymnastics, and military exercises; manual training for boys and needlework for girls. A diploma from the primary schools is a valid certificate for admission into the secondary or normal schools.

Secondary education is also organized on an excellent basis. There are at the capital two establishments of this kind, called "Gymnasio Nacional," the outcome of the old Pedro II College. The course of study in these institutions extends over seven years and embraces a large number of subjects, including modern and dead languages, mathematics in all its branches, universal geography and history, natural sciences, literature, and several other branches of learning. The requirements for admission are either an examination or a certificate of good conduct and efficiency from a primary school.

The national establishments devoted to higher or university education are the two law schools of Pernambuco and São Paulo, the two medical schools of Rio de Janeiro and Bahia, the polytechnic school at Rio de Janeiro, the mining school at Ouro Preto, State of Minas Geraes, and the school of fine arts in Rio de Janeiro.

The course of study in the law schools covers five years and embraces the following subjects: Philosophy of law, Roman, public, constitutional, civil, criminal, and international law; diplomacy, political economy, commercial law and finances; theory of civil, commercial, and criminal procedure; medical jurisprudence; forensic practice, science of administration and administrative law; history of law, national law, legislation on private law. On the termination of the course students receive the degree of bachelor of law, which entitles them to practice.

The two schools of medicine were established soon after the declaration of independence of Brazil, and their plan of study has been several times reformed according to the progress achieved by medical science. The school at Rio has the advantage of being connected with the magnificent Misericordia Hospital, which has 1,200 beds and possesses every modern appliance and the latest advantages found in any of the best institutions of its kind in the world. All schools of medicine are organized on the same plan. The national schools have 29 chairs for the various courses, 16 laboratories, and large dissecting rooms, provided with the most complete and modern apparatus for practical experiment in the various branches of science. At the conclusion of the different courses of study diplomas are granted as doctor of medicine, pharmacist, obstetrician, or dentist.

The national polytechnic schools have a general course and special courses. Students who pursue these and pass successful examinations may receive a degree of bachelor in physical or mathematical science or certificates as civil, mining, industrial, mechanical, or agricultural engineer. The general course lasts three years and comprises higher mathematics in all its branches, experimental physics, topography, chemistry in all its branches, meteorology, drawing, astronomy, applied mechanics and dynamics, mineralogy, geology, etc. All students must follow this course. The other four courses are civil, mining, industrial, and agricultural engineering, embracing especially such subjects as belong to these different callings.

In the School of Mines, located in the State of Minas Geraes, engineers are educated for mining and metallurgical works and the various branches of civil engineering. The plan is divided into two courses, a fundamental and a special course, both of three years' duration, the former comprising all subjects related to mining and metallurgical engineering in general, and the latter embracing special subjects on these sciences.

The candidate for admission to the fundamental course must pass

an examination in French, Portuguese, English or German, history, geography, cosmography, history of Brazil, elementary mathematics, physics, chemistry, and natural history, and geometrical drawings. A certificate of efficiency in the studies of the fundamental course of this school, or of similar studies in the polytechnic, military, or naval schools, or of foreign schools whose grade is similar, is required for admission. The Government is authorized to send, at the cost of the nation, to perfect their studies in the United States or in Europe, one or two of the most distinguished graduates in the special course.

The military and naval schools comprise a military preparatory school, secondary military and naval schools, and military and naval colleges for higher education, besides the schools for artillery and torpedo practice, of marksmanship, etc.

As indicated by its name, the Academy of Fine Arts is devoted to the study of painting, sculpture, architecture, and engraving, and its plan of instruction is divided into a general course and special courses on any of the above-mentioned branches of art. The general course extends over three years and embraces natural history, mythology, linear, figure, decorative, architectural, and ornamental drawing, physics and chemistry applicable to arts, descriptive geometry, archæology and ethnology, perspective and shading, and history of art. The special courses in painting, sculpture, architecture, and engraving embrace such subjects as are specially related to any of the different arts. The National Academy of Fine Arts has a picture and sculpture gallery, and a library containing over 2,250 volumes.

The National Institute of Music has been organized to give a complete education in that art, its plan of instruction being divided into an elementary course, divided into two sections; a vocal course, also divided into two sections, and an instrumental course, subdivided into several sections. There is also the preparatory and complementary course of composition of three years' duration, a literary course, including general history of music, acoustics, and esthetics of music, and finally a combined course giving instruction in choral singing, orchestral instrumentation, and chamber music for wind and string instruments.

In addition to those already mentioned, there are other schools of a special or technical character in the Federal capital and the States, such as the normal schools, schools of pharmacy, industrial schools, institutions for the blind and deaf-mutes, etc.

There are excellent public libraries in all of the leading cities of Brazil. The principal is the National Library of Rio de Janeiro, which has over 234,384 printed volumes, 181,617 manuscripts, and 100,544 iconographical pieces. From 16,000 to 18,000 persons visit yearly this library. As before stated, this institution was started with the works which King João VI brought with him to Brazil, and was greatly increased by the magnificent collection of the great Por-

tuguese bibliographer Abbott Barboza Machado. This institution has already published twenty volumes of its annals, which are of the highest interest. The National Museum also publishes works of scientific value, in the preparation of which Brazilians and foreigners collaborate. This institution, which is of the same character as the Smithsonian in Washington, has valuable collections in natural history, and has contributed greatly to the study of Brazilian ethnography. The Astronomical Observatory also issues publications in Portuguese and French replete with valuable information.

The Pedagogium, an institution for the promotion of public education, edits a Pedagogical Review in addition to other publications on educational subjects. This institution was established at the time of the educational reforms decreed by the Provisional Government, and it has now become a dependency of the municipal government of the Federal capital. It has night courses in natural history, agriculture, pedagogy, moral philosophy, and civil government. Lectures are given by distinguished professors and men of letters.

The Brazilian Academy of Letters has been established for the purpose of cultivating the national language and literature, and is composed of 40 life members. It is the duty of each member to name his chair in honor of one of the dead writers of the country. The first work to be undertaken by the academy is a bibliographical dictionary of Brazil.

Portuguese is the language spoken in Brazil. It has undergone certain modifications in pronunciation, in its vocabulary, and even in grammatical construction, much the same as the English spoken in the United States differs from that of Great Britain and its possessions. It does not constitute a language by itself, but in the Portuguese spoken in Brazil there are innumerable Indian and African neologisms and terms and other changes peculiar to the country.

The literature of Brazil very early assumed a character of its own, less influenced by the literature of the mother country than by that of the other countries of Europe.

The first national poet was Gregorio de Mattos Guerra, a satirist, born in Bahia in the seventeenth century. The best known prose writer of that time was Antonio José da Silva, who was burned at the stake in Lisbon during the inquisition. Even at that early period Brazil began to send to Portugal men of distinction, such as the brilliant diplomat and minister to the Court of João V, Alexander de Gusmão, a brother of Father Bartholomeu Lourenço de Gusmão, the inventor of the balloon (1709).

Toward the end of the eighteenth century the province of Minas Geraes was the cradle of many distinguished poets, among others Gama and Durão, epic poets; Claudio, Gonzaga and Alvarenga Peixoto, the forerunners of romanticism, while in religious poetry and other mystic subjects the monk Montalverne, Souza Caldas, and Friar

Francisco de São Carlos excelled. Not only was poetry cultivated in Brazil during this period, but the study of nature began to find favor in the latter half of the eighteenth century.

Previous to 1808 there was but one printing office in Brazil, which was closed by orders from Portugal after being in operation for three years. With the departure of King João VI, printing offices were established and newspapers issued, although there was no freedom of the press enjoyed.

All literary schools, in all their branches, have had and still have their representatives in Brazil, who are considered as famous as the greatest writers of other countries.

Fine arts have also had their worthy exponents and masters in Brazil. Victor Meirelles and Pedro Americo de Figueiredo are counted among the most distinguished of modern painters in Brazil, their military and historical paintings being considered excellent; Agostinho da Motta was a landscape painter of great merit; Zeferino da Costa, Ferraz de Almeida Junior, Decio Villares Weingartner, Amoedo, Henrique Bernardelli, Fachinetti, Parreiras, Ribeiro, Aurelio de Figueiredo, and Belmiro are painters of still life, landscapes, and portraits. Rodolpho Bernardelli, of the National School of Fine Arts, Almeida Reis, and Pinheiro are numbered among the foremost native sculptors.

Architecture likewise had to receive all its inspiration from abroad, as the specimens of the colonial period recommended themselves only for their solidity. Nevertheless, Rio de Janeiro has some beautiful buildings, such as the Church of Candelaria, the School of Fine Arts, designed by Grandjean de Montigny; the hospitals of Misericordia and Dom Pedro II, the Portuguese Lecture Hall (XVI century), the President's palace, the Imperial Palace of Boa Vista, now the National Museum; the Brazilian Bank, post-office, Department of Industry, Military School of Praia Vermelha, and the Military Academy. The residences which have been erected in recent years show the influence of Italian architecture.

Brazilians are naturally gifted in music, the popular music of Brazil being very sweet. The *modinhas* and *lundús* were the delight of Lisbon society in the last century. The taste for foreign music is very general, being fostered by education in this kind of music and by the frequent visits to Brazil of excellent Italian companies. Not only is music thoroughly understood and appreciated by the cultured classes, but many beautiful voices and fine performers are to be found among them.

The first opera sung in America was given at Rio de Janeiro in 1811 in the music hall adjoining the Royal Palace. The most distinguished of the Brazilian composers was Father José Mauricio N. Garcia (1767–1830). His "Requiem Mass," recently published by Viscount Taunay, was a revelation to the present generation. The

leading modern composers are Francisco Manoel da Silva, Elias Lobo, Gurjão, Mesquita, and, above all, Carlos Gomez (1839–1896), whose operas, *Joanna de Flandres*, *Maria Tudor*, *Guarany*, *Fosca*, *Salvador Rosa*, and *Escravo e Condor*, have been given with wonderful success both in Brazil and in Europe.

Although the Roman Catholic faith is the most extended in Brazil, there is freedom of worship especially granted by the constitution, which provides[1] that all persons and religious professions may exercise, publicly and freely, the right of worship, and may associate themselves for that purpose and acquire property, always within the provisions of the law. The Republic recognizes only civil marriage; the cemeteries are secular in character, being free to all religious sects; the instruction given in public schools is secular, and no sect or church shall receive official aid nor be dependent on nor connected with the Government of the Union or of the States.

According to the census of 1890 the population by religions was divided as follows:[2]

Roman Catholics	14,179,615
Protestants	143,743
Orthodox	1,673
Mussulmans	300
Positivists	1,327
No religion	7,257

In reference to the Protestant missions in Brazil, an authority[3] states that the first attempt toward the evangelization of the interior was made some twenty-five or more years ago by the South American Missionary Society of London, which attempted to establish a number of stations on the banks of the Purus and on one or two other confluents of the Amazon. This mission eventually failed, notwithstanding a most heroic struggle, which was carried on for some years by a few lonely workers, who one after another dropped off by death or were compelled to return by ill health. Their places not being taken by others, the mission came to an end, and at present but slight traces can be found of this early attempt at evangelizing the interior. There were in 1898 three missionary stations on the Amazon, two at Para and one at Manaos, all of them carried on by the individual efforts of their respective pastors.

The pioneer in this line of work is the Rev. Justus H. Nelson, of Houghton, Mass., who, in company with a few others, went to Brazil in 1880 to establish a mission school on the plan advocated by Bishop William Taylor, of the Methodist Church, who was an enthusiastic advocate of self-sustaining missions.

[1] Section II, Declaration of Rights, provisions 3 to 7.

[2] Almanach de Gotha, 1900.

[3] George R. Witte, in the Missionary Review of the World, November, 1898: Protestant Missions in the Amazon Valley.

Besides the Methodist Church there was also, in 1898, a little Baptist mission at Pará, partly sustained by some congregations of that denomination in Kansas, and was for a time in connection with the Christian Alliance. It was expected then that the Baptist Union o Southern Brazil would probably extend them some help, and also aid in the establishment of a station at Manáos. The mission in Manáos is carried on by a Presbyterian minister who settled there in 1887, and whose work is sustained by a number of churches in central New York.

In 1900[1] there were in Brazil 39 Presbyterian churches. The mission in central Brazil has centers at Bahia, Larangeiros, and Feira de Santa Anna, and that of southern Brazil at Rio de Janeiro, Castro, São Paulo, Curityba, and Florianopolis. These missions have founded schools, among others the McKenzie College at São Paulo, which, according to the report in reference, has a total enrollment of 546 students of all ages, and a high average attendance of 496. Of the total number of pupils 410 pay full tuition, 32 are received at reduced rates, and 105 boarding and day pupils entirely free. As to nationality, there were 339 Brazilians, 48 Germans, 38 Italians, 18 Americans, 14 French, 12 English, and 17 of other nationalities. Of Roman Catholics there were 427, Protestants 117, and 2 Hebrews. The college was established twenty-nine years ago; but records can only be found beginning with 1885, since which time 6,077 girls and boys have been under instruction

The Independent Synod of Brazil, which was organized in 1888, has established a home missionary society, and supports a theological seminary at São Paulo, for which buildings at a cost of $10,000 have been asked. Two weekly papers are published in the interest of the churches of the synod, which is entirely independent, having no relation to general assemblies of other lands.

According to the report of the Secretary of Industry[2] in 1899, there were 115 evangelical churches in all the States of Brazil.

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[1] Sixty-third Annual Report of the Board of Foreign Missions of the Presbyterian Church in the United States of America, New York, 1900.

[2] Relatorio do Ministerio da Industria, Viagão e Obras Publicas, 1899, p. 177.

CHAPTER XVII.

PATENTS AND TRADE-MARKS.

Patents are granted in Brazil for new inventions or processes or for improvements on old ones.

By new is meant those which have not been used either in Brazil or in a foreign country, and no description of which has been published. Inventions that may injure morals, public safety, or health, or which have no useful result can not be patented.

The term of a patent for an original invention is fifteen years. When improvements on an invention already protected are patented, the term of the subsequent patent expires with the original patent. Patents must be worked within three years from issue, and expire if they cease to be used for a year.

If it is necessary for the patent to become public property, the State has the right to take possession thereof before the expiration of the term. The patent right may be transferred by law.

Inventors who have patents in other countries can have their rights confirmed in Brazil, and this confirmation has the same effect as the granting of a patent. The patent in Brazil expires at the same time as the foreign patent.

Inventors who apply for patents in foreign countries and make application in Brazil within seven months from the date of filing said foreign applications do not have their rights invalidated by the use of the invention, by publication of a description thereof, or by the filing of a similar application.

Provisional (caveat) protection is granted inventors who wish to complete their inventions or to exhibit them before applying for patent.

During the first year of the patent only the inventor or his legitimate successor may obtain a patent for an improvement on the invention. Petitions may, however, be filed by outsiders during this period. When a person other than the original patentee applies for a patent on an improvement, and the original patentee makes application within one year from the date of the previous application, the patent is issued to the original patentee. Should a patent for an improvement be granted to another person, neither he nor the original patentee can use the improvement without mutual consent; nor can the inventor of the improvement use the original invention, as long as the patent lasts, without the consent of the original patentee.

If a patentee invents an improvement on his original invention,

there may be issued a certificate for the improvement, to be noted on the original patent. For this certificate the inventor will pay an amount equal to the annuities still to be paid on the patent. This is the only payment required for the certificate.

If two or more persons apply for patent for the same invention at the same time (except in the case mentioned above), the Government will order them to agree between themselves or before a judge as to priority.

Applicants for patents or for certificates of improvements must deposit in duplicate in the Department of Public Archives a sealed envelope containing a description of the invention, its object, and the method of using it, together with drawings, models, and specimens necessary to make it understood by those skilled in the art. The statement shall conclude by clearly specifying the characteristics of the invention for which a patent is asked. The title, stating the object of the invention, shall be given at the top of the first page, and all shall be written in Portuguese, without emendations, interlineations, or erasures, dated and signed by the inventors or their agents. Weights and measures shall be given according to the metric system, temperature by the centigrade method, and density shall be expressed by the specific weight.

Drawings shall be made on strong white paper, single sheets, and unfolded. Indelible ink shall be used, to facilitate reproductions. The sheets shall be 33 centimeters (12.99 inches) in length, by 21 or 42 or 63 in width (8.26 inches, 16.53 inches, or 24.80 inches), with a single line molding, leaving a margin of 2 centimeters (0.78 inch). The inventor can add colored drawings if he desires. Duplicates of complicated or large models are not required. In case of inventions already patented, the modifications are indicated in dotted lines.

The petition for patent shall declare the name, nationality, profession, domicile, or actual residence of the petitioner, the nature and object of the invention. The petition is accompanied by a statement of the specifications filed; a power of attorney; the original patent, or a notarial copy, if it relates to a confirmation of a foreign patent; the original patent, in case of improvement made by the patentee on his own invention; or the certificate of the original patent, in case of an improvement on the invention of another.

The petition, statement, etc., must be written on paper 33 by 21 centimeters in size. Original patents are not included in this regulation. Petitions presented to the Secretary of State for Industry, Communications, and Public Works shall receive priority of consideration. If a petition is irregular, it is rejected; the applicant can correct it without prejudice to the priority which belongs to it.

In addition to the regular fee for issuing a patent there is an annual tax of 20 *milreis* for the first year, 30 *milreis* for the second, 40 for the third, increasing at this rate during the period of the patent.

The patent law now in force bears No. 3129 and date October 14,

1882, and was regulated by decree No. 8820, December 30 of the same year.

The number of patents granted from 1830, date of the old law, to 1882 was 677; from 1882 to 1895, was 2,021, and in the year 1898, 279 patents and 38 provisional guarantees, as prescribed by the law now in force.

The trade-mark law now in force is the same as that of October 14, 1887, with the regulations of December 31 of the same year. According to said law any manufacturer or merchant may register a trade-mark. A trade-mark consists of anything not prohibited by the law which distinguishes an object from the same or a similar object of different origin. Every name, necessary or common, a denomination, signature of firm name, as well as all letters or figures, can only serve for this purpose when of a distinctive form.

The following can not be registered as trade marks: Marks containing or consisting of: (1) Arms, crests, medals, or public or official distinctive signs, whether native or foreign, when for their use proper authorization shall not have been obtained; (2) the signature or name of a commercial firm of which the applicant can not legally make use; (3) indication of a determined locality or establishment which is not that of the origin of the object, whether or not there be joined to this indication a fictitious or another's name; (4) words, pictures, or allegories which involve offense to either individuals or the public decorum; (5) reproduction of another mark already registered for objects of the same species; (6) complete or partial imitation of a mark already registered for products of the same species which may lead to error or confusion of the buyer; the possibility of error or confusion shall be considered verified whenever the differences between the two marks can not be recognized without careful comparison or examination. (Art. 8.)

Registration, deposit, and publication under the present law are indispensable for the guarantee of the exclusive use of trade-marks. The mark can only be transferred with the business. Transfer shall be noted on the registry book on the exhibition of the document. The same note shall be made if the mark remains after a change of firm. In such case publication is necessary.

Duration of trade-marks is fifteen years, but they can be renewed for same term repeatedly. They lapse on failure to use for three years.

The Junta Commercial of the place of the house or of the principal house (when branches) and of Rio de Janeiro for foreign marks and for those registered in other juntas are empowered to register. The interested party or his special attorney must make a petition, accompanied by three copies of the mark and containing a description of the mark and all its accessories and explanations of the same, a designation of the kind of industry or of commerce to which it is to be applied, the profession of the applicant, and his residence.

Appeal to the court of second instance may be had from decisions refusing registration, and also in case of decision admitting to registration by whoever may consider himself prejudicially affected; (2) the interested party in cases 2 and 3, article 8; (3) the injured individual in case 4, article 8; (4) the public prosecutor in cases 1 and 2, last part article 8. Term of appeal, five days for residents; thirty days for nonresidents.

Every personal or firm name can only be used as a trade-mark when clothed in a distinctive form.

Infringement shall be punished by a fine of from 500 to 5,000 *milreis* or by imprisonment from one to six months. Infringement is (1) reproducing, in entirety or in part, a mark duly registered and published without authority from its proprietor or his legal representative; (2) making use of another's mark or of a counterfeited mark in the terms of No. 1; (3) selling or exposing for sale objects bearing another's mark or counterfeited in whole or in part; (4) imitating a mark so that it may mislead the buyer; (5) using the mark thus imitated; (6) selling or exposing for sale objects bearing the imitated mark; (7) using a commercial name or signature not belonging to the one who uses it, whether or not it forms part of a registered mark. (Art. 14.)

Infringement shall also be punished with fines of from 100 to 500 *milreis* in favor of the State, when: (1) Without proper authority, use is made of native or foreign arms, crests, public or official distinctive signs; (2) marks which are offensive to public decorum; (3) a mark containing indication of a locality or establishment which is not that of the origin of the object, whether or not there be joined to this indication a supposed or another's name; (4) selling or exposing for sale merchandise or products bearing marks as described in Nos. 1 and 2 of this article; (5) selling or exposing for sale merchandise or products marked as in No. 3. (Art. 15.)

Whoever shall use a mark containing personal offense, or sell or expose for sale articles bearing such a mark, shall suffer the penalties of article 237, section 3, of the criminal code.

To constitute the imitation referred to in Nos. 4 and 6 of article 15 it is not necessary that the resemblance to the mark be complete, it sufficing, whatever the difference may be, that there exist a possibility of mistake or confusion, as laid down in the latter part of article 8.

The usurpation of a name or commercial signature treated of in No. 7, whether the reproduction be entire, or with additions, omissions, or alterations, shall be considered to exist if there be the said possibility of mistake or confusion by the buyer.

In cases of infringement of goods and labels the interested party may solicit: Seizure and destruction of counterfeited or imitated marks in the workshop where they are prepared, or wherever they may be found, before being used for criminal purposes; destruction of the counterfeited or imitated marks on the packages or objects bearing same before their dispatch by the fiscal department (custom-

house) even though the wrapper and the merchandise and produce be thus damaged. The objects seized shall serve to guarantee the payment of the fines and damages for which they shall be sold by auction during the progress of the action if they be of a substance which quickly deteriorates, and otherwise at the execution of the sentence. (Art. 21.)

Criminal action against delinquents, stated in Nos. 1, 2, and 4 of article 15, shall be instituted by the public prosecutor of the district in which the objects bearing the marks treated of be found.

Those competent in the cases Nos. 3 and 5 are any merchant or manufacturer of a similar article residing in the place of its production and the owner of the establishment falsely indicated; and against those delinquents referred to in articles 14 and 16, the injured or interested parties.

During the year 1895, 167 trade-marks were registered, of which 99 were national and 68 foreign; of the former, 53 were industrial trade-marks and commercial trade-marks; of the latter, 50 were industrial trade-marks and 18 commercial.

Of the foreign trade-marks, 21 were from England, 17 from France, 12 from the United States, 10 from Portugal, 6 from Germany, 1 from Belgium, and 1 from Holland.

According to the report of the Secretary of Industry for 1899, the number of trade-marks registered with the Junta Commercial of Rio de Janeiro was 192, embracing 122 national and 70 foreign marks. Of the former there were 72 industrial and 50 commercial trade-marks, and of the latter 62 industrial and 8 commercial marks. Of the foreign trade-marks, 24 were from England, 15 from Germany, 8 from France, 8 from the United States, 5 from Portugal, 4 from Belgium, 2 from Italy, 2 from Denmark, 1 from Spain, and 1 from Sweden.

In regard to counterfeit marks, the regulation law for the execution of article 20 of law No. 428, of December 10, 1896, provides that "The manufacture and importation of labels and marks of foreign products for the falsification of national products to be sold as foreign products shall be considered an infringement and subject to the penalties of the penal code, together with a fine of from 1,000 to 5,000 *milreis*.

"Manufacturers of drugs, chemical and pharmaceutical products must stamp on the label the name of the product, where produced, and selling price, under penalty of being seized and fined from 20 to 500 *milreis*. It is prohibited, under the same penalties, to offer for sale merchandise manufactured in the country bearing labels in a foreign language."

The purpose of the legislator was to guarantee national products against any frauds which have for their object the presentation of national goods as foreign, and he has endeavored to look after the interests of the manufacturers of the country and the national products which he wishes to be consumed in the country without their being confused with foreign products.

CHAPTER XVIII.

WEIGHTS AND MEASURES—EXCHANGE.

The system of weights and measures lawfully used in Brazil is the French metric system, introduced in 1862 and made obligatory in 1874. The old system of weights and measures has not been entirely abandoned, however, and is frequently used by the people in their domestic and everyday affairs. The following is a list of these weights and measures, with their equivalents in the American system:

WEIGHTS.

Tonelada	pounds	1,745.12
Quintal	do	129.27
Arroba	do	32.32
Libra	do	1.01
Marco	ounces	8.008
Onça	do	1.001
Oitavo	drams	2

LONG MEASURE.

Braça	feet	7.218
Vara	do	3.609
Pé	do	1.10
Palmo	inches	8.64
Pollegada	do	1.08
Milha	miles	1.37
Legua	do	4.11

DRY MEASURE.

Moio	bushels	61.7
Fanga	do	4.1
Alqueire	do	1
Quarta	peck	1
Selamin	quart	1

LIQUID MEASURE.

Tonel	quarts	887.6
Pipa	do	443.8
Almude	do	31.75
Canada	do	2.8
Quartilhos	pints	1.4

To long measures the *covado* may be added, which is equivalent in the French metric system to 0.68 meter. Leagues are divided into

leagues of 18 per degree, equivalent to 2,806 *braças*, or 6,172 meters, and leagues of *sesmaria*, equivalent to 3,000 *braças*, or 6,600 meters.

The monetary system of Brazil rests theoretically on a gold basis, silver being subsidiary; but practically only paper money and nickel coins of small value are in circulation, silver even having become scarce. The unit is the *real*, but the smallest coin is of the value of 10 *reis*. The Brazilian *milreis*, which has only half the value of the Portuguese *milreis*, is equivalent to 27d. gold, par value, or 54.6 cents, or 2.83 francs.

Table of exchange from 8 to 28 pence per milreis.[1]

General exchange.	England.			Portugal.		France.		Germany.		United States.
	Value of—			Premium of Portuguese money.	Value of paper milreis in Portuguese reis.	Value of—		Value of—		Value of dollar in reis.
	Pound sterling in reis.	Shilling in reis.	Pence in reis.			Franc in reis.	Brazilian milreis in francs.	Reichsmark in reis.	Paper milreis in reichsmarks.	
				Per cent.						
8	30.000	1.500	125	575	148	1.191	0.83	1.470	0.68	6.176
1/16	29.767	1.488	124	569	149	1.181	0.84	1.458	0.68	6.128
1/8	29.538	1.476	123	564	150	1.173	0.85	1.448	0.69	6.081
3/16	29.313	1.465	122	559	151	1.164	0.85	1.439	0.69	6.035
1/4	29.090	1.454	121	554	152	1.155	0.86	1.426	0.70	5.989
5/16	28.872	1.443	120	549	154	1.146	0.87	1.416	0.75	5.944
3/8	28.657	1.432	119	544	155	1.138	0.87	1.405	0.70	5.899
7/16	28.444	1.422	118	540	156	1.129	0.88	1.395	0.71	5.856
1/2	28.235	1.411	117	535	157	1.121	0.89	1.385	0.72	5.813
9/16	28.029	1.401	116	530	158	1.113	0.89	1.374	0.72	5.770
5/8	27.826	1.391	116	526	160	1.105	0.90	1.364	0.73	5.728
11/16	27.626	1.381	115	521	161	1.097	0.91	1.355	0.73	5.687
3/4	27.429	1.371	114	517	162	1.088	0.91	1.345	0.74	5.646
13/16	27.234	1.361	113	512	163	1.081	0.92	1.335	0.74	5.606
7/8	27.042	1.352	112	508	164	1.073	0.93	1.326	0.75	5.567
15/16	26.853	1.342	112	504	165	1.066	0.93	1.317	0.75	5.528
9	26.667	1.333	111	500	166	1.058	0.94	1.310	0.76	5.490
1/16	26.483	1.324	110	495	168	1.051	0.94	1.299	0.76	5.452
1/8	26.301	1.315	109	491	169	1.044	0.95	1.290	0.77	5.414
3/16	26.122	1.306	109	487	170	1.037	0.96	1.281	0.78	5.377
1/4	25.946	1.297	108	482	171	1.030	0.97	1.272	0.78	5.341
5/16	25.772	1.288	107	479	172	1.023	0.97	1.264	0.79	5.305
3/8	25.600	1.280	106	476	173	1.016	0.98	1.255	0.79	5.270
7/16	25.430	1.271	106	472	174	1.009	0.99	1.247	0.80	5.235
1/2	25.263	1.263	105	468	176	1.003	1.00	1.238	0.80	5.201
9/16	25.098	1.254	104	464	177	996	1.00	1.231	0.81	5.167
5/8	24.935	1.246	103	461	178	990	1.01	1.223	0.81	5.133
11/16	24.774	1.238	103	457	179	983	1.01	1.215	0.82	5.100
3/4	24.615	1.230	102	453	180	977	1.02	1.207	0.82	5.067
13/16	24.459	1.222	101	450	181	971	1.02	1.199	0.83	5.035
7/8	24.304	1.215	101	446	183	965	1.03	1.192	0.84	5.003
15/16	24.151	1.207	100	443	184	959	1.04	1.184	0.84	4.971
10	24.000	1.200	100	440	185	953	1.04	1.177	0.85	4.941
1/16	23.851	1.192	99	437	186	947	1.05	1.169	0.85	4.910
1/8	23.703	1.185	99	433	187	941	1.06	1.162	0.86	4.880
3/16	23.558	1.178	98	430	188	935	1.07	1.155	0.86	4.850
1/4	23.414	1.170	97	427	189	929	1.07	1.148	0.87	4.820
5/16	23.272	1.163	97	423	191	924	1.08	1.141	0.87	4.790
3/8	23.132	1.156	96	420	192	918	1.08	1.134	0.88	4.762
7/16	22.994	1.149	96	417	193	913	1.09	1.128	0.88	4.733
1/2	22.857	1.142	95	414	195	907	1.10	1.121	0.89	4.705
9/16	22.721	1.136	94	411	195	902	1.10	1.114	0.89	4.677
5/8	22.588	1.129	94	408	196	897	1.11	1.108	0.90	4.650
11/16	22.456	1.122	93	405	198	891	1.12	1.101	0.90	4.623
3/4	22.325	1.116	93	402	199	886	1.12	1.095	0.91	4.596
13/16	22.196	1.109	92	399	200	881	1.13	1.088	0.91	4.570
7/8	22.069	1.103	92	396	201	876	1.14	1.082	0.92	4.543
15/16	21.942	1.097	91	393	202	871	1.14	1.076	0.92	4.517
11	21.818	1.090	91	390	203	866	1.15	1.070	0.93	4.491
1/16	21.695	1.084	90	388	205	861	1.16	1.064	0.94	4.466
1/8	21.573	1.078	90	385	206	856	1.17	1.058	0.94	4.441
3/16	21.452	1.072	89	382	207	851	1.17	1.052	0.95	4.416
1/4	21.333	1.066	89	380	208	847	1.18	1.046	0.95	4.391
5/16	21.215	1.060	88	377	209	842	1.18	1.040	0.96	4.367
3/8	21.098	1.055	88	375	210	838	1.19	1.034	0.96	4.343

[1] One *milreis* is represented 1$000. The figures 29$767 are read 29 *milreis* 767 *reis*.

Table of exchange from 8 to 30 pence per milreis—Continued.

Rate of exchange.	England. Value of— Pound sterling, in reis.	England. Value of— Shilling, in reis.	England. Value of— Pence, in reis.	Portugal. Premium of Portuguese money.	Portugal. Value of paper milreis in Portuguese reis.	France. Value of— Franc, in reis.	France. Value of— Brazilian milreis in francs.	Germany. Value of— Reichsmark, in reis.	Germany. Value of— Brazilian milreis in reichsmarks.	United States. Value of dollar, in reis.
				Per cent.						
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Table of exchange from 8 to 28 pence per milreis—Continued.

General exchange.	England. Value of— Pound sterling in reis.	England. Value of— Shilling in reis.	England. Value of— Pence in reis.	Portugal. Premium of Portuguese money.	Portugal. Value of paper milreis in Portuguese reis.	France. Value of— Franc in reis.	France. Value of— Brazilian milreis in francs.	Germany. Value of— Reichsmark in reis.	Germany. Value of— Paper milreis in reichsmarks.	United States. Value of dollar in reis.
				Per cent.						
16 1/16	14.938	747	62	237	296	593	1.68	732	1.37	3.076
1/8	14.883	744	62	234	298	590	1.69	729	1.37	3.064
3/16	14.826	741	62	233	300	588	1.69	726	1.38	3.052
1/4	14.769	738	61	232	301	586	1.70	721	1.38	3.040
5/16	14.712	735	61	231	302	583	1.71	722	1.38	3.028
3/8	14.656	733	61	230	303	581	1.72	718	1.39	3.017
7/16	14.600	730	61	229	304	579	1.72	715	1.39	3.006
1/2	14.545	727	60	228	304	577	1.73	713	1.40	2.994
9/16	14.490	724	60	226	305	575	1.73	710	1.41	2.983
5/8	14.436	732	60	224	306	573	1.74	707	1.41	2.972
11/16	14.382	719	60	223	308	571	1.74	705	1.42	2.961
3/4	14.328	716	59	222	310	569	1.75	702	1.42	2.950
13/16	14.275	714	59	221	311	567	1.76	699	1.43	2.939
7/8	14.222	711	59	220	312	565	1.77	697	1.43	2.928
15/16	14.170	708	59	219	313	563	1.78	694	1.44	2.917
17	14.118	706	59	218	314	560	1.79	692	1.44	2.906
1/16	14.066	703	59	217	315	558	1.79	689	1.45	2.896
1/8	14.015	701	58	216	316	556	1.80	687	1.46	2.885
3/16	13.964	698	58	214	318	554	1.80	684	1.46	2.875
1/4	13.913	696	58	212	320	552	1.81	681	1.47	2.864
5/16	13.813	693	58	211	321	550	1.82	679	1.47	2.854
3/8	13.813	691	58	210	322	548	1.82	677	1.48	2.843
7/16	13.763	688	57	209	323	546	1.83	674	1.48	2.833
1/2	13.714	686	57	208	324	544	1.83	672	1.49	2.823
9/16	13.665	683	57	207	325	542	1.84	669	1.49	2.813
5/8	13.617	681	57	206	326	540	1.85	667	1.50	2.803
11/16	13.569	678	57	205	327	538	1.86	665	1.50	2.793
3/4	13.521	676	56	204	328	536	1.86	663	1.51	2.783
13/16	13.474	674	56	203	329	534	1.87	660	1.51	2.773
7/8	13.427	671	56	202	330	532	1.88	658	1.52	2.764
15/16	13.380	669	56	201	331	531	1.88	655	1.52	2.754
18	13.333	667	56	200	333	530	1.89	653	1.53	2.745
1/16	13.287	664	55	199	334	528	1.89	651	1.53	2.735
1/8	13.241	662	55	198	336	526	1.90	649	1.54	2.726
3/16	13.196	660	55	197	337	524	1.90	647	1.54	2.717
1/4	13.151	658	55	196	338	522	1.91	644	1.54	2.707
5/16	13.106	655	55	195	339	520	1.91	642	1.55	2.698
3/8	13.061	653	54	194	341	519	1.92	640	1.55	2.688
7/16	13.017	651	54	193	342	517	1.92	638	1.56	2.679
1/2	12.973	649	54	192	343	515	1.94	636	1.56	2.670
9/16	12.929	646	54	191	345	513	1.94	634	1.57	2.661
5/8	12.886	644	54	190	346	511	1.95	632	1.57	2.653
11/16	12.843	642	54	189	347	510	1.95	630	1.58	2.644
3/4	12.800	640	53	188	348	508	1.96	628	1.58	2.635
13/16	12.757	638	53	187	349	507	1.96	626	1.59	2.624
7/8	12.715	636	53	186	350	505	1.98	624	1.59	2.614
15/16	12.673	634	53	185	351	504	1.98	622	1.60	2.607
19	12.632	632	53	184	352	502	1.99	619	1.61	2.600
1/16	12.590	630	52	183	353	501	1.99	617	1.61	2.592
1/8	12.549	627	52	182	355	499	2.00	615	1.62	2.583
3/16	12.508	625	52	181	356	497	2.01	613	1.62	2.574
1/4	12.468	623	52	180	357	495	2.01	611	1.63	2.566
5/16	12.427	621	52	180	358	493	2.02	609	1.63	2.557
3/8	12.387	619	52	179	359	492	2.03	607	1.64	2.549
7/16	12.347	617	51	178	360	491	2.03	605	1.64	2.541
1/2	12.308	615	51	177	361	489	2.04	603	1.65	2.533
9/16	12.268	613	51	176	362	488	2.05	601	1.65	2.525
5/8	12.229	611	51	175	364	486	2.06	599	1.66	2.517
11/16	12.190	610	51	174	365	485	2.06	597	1.66	2.509
3/4	12.152	608	51	174	366	483	2.07	595	1.67	2.501
13/16	12.114	606	50	173	367	481	2.07	593	1.67	2.493
7/8	12.075	604	50	172	368	479	2.08	592	1.68	2.485
15/16	12.038	602	50	171	369	478	2.09	590	1.69	2.478
20	12.000	600	50	170	370	477	2.10	588	1.70	2.470
1/16	11.963	598	50	169	371	476	2.10	587	1.70	2.463
1/8	11.925	596	50	168	373	474	2.11	585	1.71	2.455
3/16	11.889	594	50	167	374	473	2.11	583	1.71	2.448
1/4	11.852	593	49	167	375	471	2.12	581	1.72	2.440
5/16	11.815	591	49	166	376	470	2.13	580	1.72	2.433
3/8	11.779	589	49	165	377	468	2.14	578	1.73	2.425
7/16	11.743	587	49	164	378	467	2.14	576	1.73	2.418
1/2	11.707	585	49	163	379	465	2.15	574	1.74	2.410
9/16	11.672	584	49	162	380	464	2.15	573	1.74	2.403

Table of exchange from 8 to 28 pence per milreis—Continued.

General exchange.	England.			Portugal.		France.		Germany.		United States.
	Value of—					Value of—		Value of—		
	Pound sterling in reis.	Shilling in reis.	Pence in reis.	Premium of Portuguese money.	Value of paper milreis in Portuguese reis.	Franc in reis.	Brazilian milreis in francs.	Reichsmark in reis.	Paper milreis in reichsmarks.	Value of dollar in reis.
				Per cent.						
20	11.636	582	48	162	382	462	2.16	571	1.75	2.395
1/16	11.601	580	48	161	383	461	2.16	569	1.75	2.388
1/8	11.566	578	48	160	384	459	2.17	567	1.76	2.381
3/16	11.532	577	48	160	386	458	2.18	565	1.77	2.374
1/4	11.497	575	48	159	387	457	2.18	564	1.77	2.367
5/16	11.463	573	48	158	388	456	2.19	562	1.78	2.360
21	11.429	571	48	157	389	454	2.20	560	1.79	2.353
1/16	11.395	570	47	157	391	453	2.21	558	1.79	2.346
1/8	11.361	568	47	156	392	452	2.21	557	1.80	2.339
3/16	11.327	566	47	155	343	451	2.22	555	1.80	2.332
1/4	11.294	565	47	154	394	450	2.22	553	1.81	2.325
5/16	11.261	563	47	154	395	449	2.23	551	1.81	2.318
3/8	11.228	561	47	153	396	447	2.24	550	1.82	2.311
7/16	11.195	560	47	152	397	446	2.25	548	1.82	2.304
1/2	11.163	558	47	151	398	444	2.25	547	1.83	2.298
9/16	11.130	557	46	151	399	443	2.26	545	1.83	2.291
5/8	11.098	555	46	150	401	441	2.26	544	1.84	2.284
11/16	11.066	553	46	149	402	440	2.27	542	1.84	2.278
3/4	11.034	552	46	148	403	438	2.28	540	1.85	2.271
13/16	11.003	550	46	148	404	437	2.29	539	1.85	2.264
7/8	10.971	549	46	147	405	436	2.29	538	1.86	2.258
15/16	10.940	547	46	146	406	435	2.30	536	1.86	2.251
22	10.909	545	45	145	407	433	2.31	535	1.87	2.245
1/16	10.878	544	45	145	409	432	2.32	533	1.87	2.237
1/8	10.847	542	45	144	410	431	2.32	532	1.88	2.232
3/16	10.817	541	45	144	411	430	2.33	530	1.88	2.226
1/4	10.787	539	45	143	412	429	2.34	529	1.89	2.220
5/16	10.756	538	45	143	414	428	2.35	527	1.89	2.214
3/8	10.726	536	45	141	415	426	2.35	526	1.90	2.208
7/16	10.696	535	45	141	416	425	2.36	524	1.90	2.202
1/2	10.667	533	44	140	417	423	2.36	523	1.91	2.196
9/16	10.637	532	44	140	419	422	2.37	521	1.91	2.190
5/8	10.608	530	44	139	420	421	2.37	520	1.92	2.184
11/16	10.579	529	44	138	421	420	2.38	518	1.92	2.178
3/4	10.549	527	44	137	422	418	2.38	517	1.93	2.172
13/16	10.521	526	44	137	423	417	2.39	515	1.94	2.166
7/8	10.492	525	44	136	424	416	2.40	514	1.95	2.160
15/16	10.463	523	44	136	425	415	2.41	512	1.95	2.154
23	10.435	522	43	135	426	414	2.41	511	1.96	2.148
1/16	10.407	520	43	135	428	413	2.42	510	1.96	2.143
1/8	10.378	519	43	134	429	412	2.42	509	1.97	2.137
3/16	10.350	518	43	133	430	411	2.43	508	1.97	2.131
1/4	10.323	516	43	132	431	410	2.43	506	1.98	2.125
5/16	10.295	515	43	132	432	409	2.44	504	1.98	2.119
3/8	10.267	513	43	131	433	408	2.45	503	1.99	2.113
7/16	10.240	512	43	131	434	407	2.46	501	1.99	2.108
1/2	10.213	511	43	130	435	405	2.46	400	2.00	2.102
9/16	10.186	509	42	130	437	404	2.47	499	2.00	2.097
5/8	10.159	508	42	129	438	403	2.47	498	2.01	2.091
11/16	10.132	507	42	128	439	402	2.48	496	2.01	2.085
3/4	10.105	505	42	127	440	401	2.49	495	2.02	2.080
13/16	10.079	504	42	127	441	400	2.50	493	2.02	2.074
7/8	10.052	503	42	126	442	399	2.50	492	2.03	2.069
15/16	10.026	501	42	126	443	398	2.51	491	2.03	2.063
24	10.000	500	42	125	444	397	2.52	490	2.04	2.058
1/16	9.974	499	42	124	446	396	2.53	489	2.04	2.052
1/8	9.948	497	41	124	447	395	2.53	487	2.05	2.047
3/16	9.922	496	41	123	448	394	2.54	486	2.06	2.041
1/4	9.897	495	41	123	449	393	2.54	484	2.06	2.036
5/16	9.871	494	41	122	450	392	2.55	483	2.07	2.031
3/8	9.846	492	41	122	451	391	2.55	482	2.07	2.026
7/16	9.821	491	41	120	452	390	2.56	481	2.08	2.021
1/2	9.796	490	41	120	454	389	2.57	480	2.08	2.016
9/16	9.771	489	41	119	455	388	2.58	479	2.09	2.011
5/8	9.746	487	41	119	456	387	2.58	478	2.09	2.006
11/16	9.722	486	41	118	458	386	2.59	476	2.10	2.001
3/4	9.697	485	40	118	459	385	2.59	475	2.10	1.996
13/16	9.673	484	40	117	460	384	2.60	474	2.11	1.991
7/8	9.648	482	40	117	462	383	2.60	473	2.11	1.986
15/16	9.624	481	40	116	464	382	2.61	472	2.12	1.981
25	9.600	480	40	116	465	381	2.62	470	2.12	1.976
1/16	9.576	478	40	116	466	380	2.62	469	2.13	1.971
1/8	9.552	477	40	115	467	380	2.63	468	2.14	1.966
3/16	9.528	476	40	115	468	378	2.63	467	2.14	1.961

Table of exchange from 8 to 28 pence per milreis—Continued.

General exchange.	England.			Portugal.		France.		Germany.		United States.
	Value of—					Value of—		Value of—		
	Pound sterling in reis.	Shilling in reis.	Pence in reis.	Premium of Portuguese money.	Value of paper milreis in Portuguese reis.	Franc in reis.	Brazilian milreis in francs.	Reichsmark in reis.	Paper milreis in reichsmarks.	Value of dollar in reis.
				Per cent.						
25 1/2	9.504	475	39	114	469	378	2.64	466	2.15	1.956
5/16	9.481	473	39	114	469	376	2.65	465	2.15	1.952
3/8	9.457	472	39	113	470	376	2.66	464	2.16	1.946
7/16	9.434	471	39	113	471	374	2.66	462	2.16	1.944
1/2	9.411	470	39	112	472	374	2.67	461	2.17	1.937
9/16	9.388	469	39	112	473	372	2.67	460	2.17	1.932
5/8	9.365	468	39	111	475	372	2.68	459	2.18	1.927
11/16	9.343	467	39	111	476	371	2.69	458	2.18	1.923
3/4	9.320	466	38	110	477	371	2.70	457	2.19	1.918
13/16	9.297	465	38	110	478	369	2.70	456	2.19	1.914
7/8	9.275	463	38	109	479	369	2.71	455	2.20	1.909
15/16	9.253	462	38	109	480	367	2.71	453	2.20	1.904
26	9.231	461	38	108	481	367	2.72	452	2.21	1.900
1/16	9.208	460	38	108	482	366	2.72	451	2.21	1.895
1/8	9.186	459	38	107	484	365	2.73	450	2.22	1.891
3/16	9.164	458	38	107	485	364	2.74	449	2.22	1.886
1/4	9.142	457	38	106	486	363	2.75	448	2.23	1.882
5/16	9.121	456	38	106	487	362	2.75	447	2.23	1.877
3/8	9.099	455	38	105	489	362	2.76	446	2.24	1.873
7/16	9.078	453	37	105	490	361	2.76	445	2.24	1.867
1/2	9.056	452	37	104	491	360	2.77	444	2.25	1.864
9/16	9.035	451	37	104	492	359	2.78	443	2.26	1.860
5/8	9.014	450	37	103	494	358	2.79	441	2.27	1.855
11/16	8.992	449	37	103	495	357	2.79	441	2.27	1.851
3/4	8.971	448	37	102	496	356	2.80	440	2.27	1.846
13/16	8.951	447	37	102	497	355	2.80	439	2.28	1.842
7/8	8.930	446	37	101	498	354	2.81	438	2.28	1.838
15/16	8.909	445	37	101	499	354	2.82	437	2.29	1.834
27	8.889	444	37	100	500	353	2.83	436	2.29	1.830
1/16	8.868	443	37	100	501	352	2.84	435	2.30	1.825
1/8	8.847	442	37	99	503	352	2.85	423	2.31	1.821
3/16	8.827	441	37	99	504	351	2.85	433	2.31	1.817
1/4	8.807	440	36	98	505	350	2.86	431	2.32	1.813
5/16	8.787	439	36	98	506	349	2.86	431	2.32	1.809
3/8	8.767	438	36	97	507	348	2.87	429	2.33	1.805
7/16	8.747	437	36	97	508	347	2.87	429	2.33	1.800
1/2	8.727	436	36	96	509	347	2.88	427	2.34	1.797
9/16	8.707	435	36	96	510	345	2.89	427	2.34	1.792
5/8	8.687	434	36	96	512	345	2.90	425	2.35	1.789
11/16	8.668	433	36	96	513	344	2.90	424	2.36	1.784
3/4	8.648	432	36	95	514	344	2.91	422	2.37	1.781
13/16	8.629	431	36	95	515	343	2.91	421	2.37	1.776
7/8	8.609	430	35	94	516	343	2.92	420	2.38	1.773
15/16	8.590	429	35	94	517	341	2.92	419	2.38	1.768
28	8.571	428	35	93	518	341	2.93	418	2.39	1.763
1/16	8.552	427	35	92	519	340	2.94	418	2.39	1.758
1/8	8.533	426	35	92	520	339	2.95	417	2.40	1.755
3/16	8.514	425	35	91	522	338	2.96	417	2.40	1.752
1/4	8.495	424	35	91	523	338	2.96	416	2.40	1.748
5/16	8.476	422	35	90	525	337	2.97	415	2.41	1.745
3/8	8.457	421	35	90	526	336	2.97	415	2.41	1.741
7/16	8.439	420	35	90	527	335	2.98	414	2.42	1.737
1/2	8.421	419	35	89	528	335	2.98	413	2.42	1.733
9/16	8.402	418	34	89	529	334	2.99	412	2.43	1.729
5/8	8.384	417	34	88	531	333	3.00	411	2.43	1.725
11/16	8.366	416	34	88	532	332	3.01	410	2.44	1.722
3/4	8.348	415	34	87	533	332	3.01	409	2.44	1.718
13/16	8.329	414	34	87	534	331	3.02	408	2.45	1.714
7/8	8.311	412	34	87	535	330	3.03	407	2.46	1.710
15/16	8.293	411	34	86	537	329	3.04	406	2.47	1.707

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A GEOGRAPHICAL SKETCH,

WITH SPECIAL REFERENCE TO

ECONOMIC CONDITIONS AND PROSPECTS OF FUTURE DEVELOPMENT.

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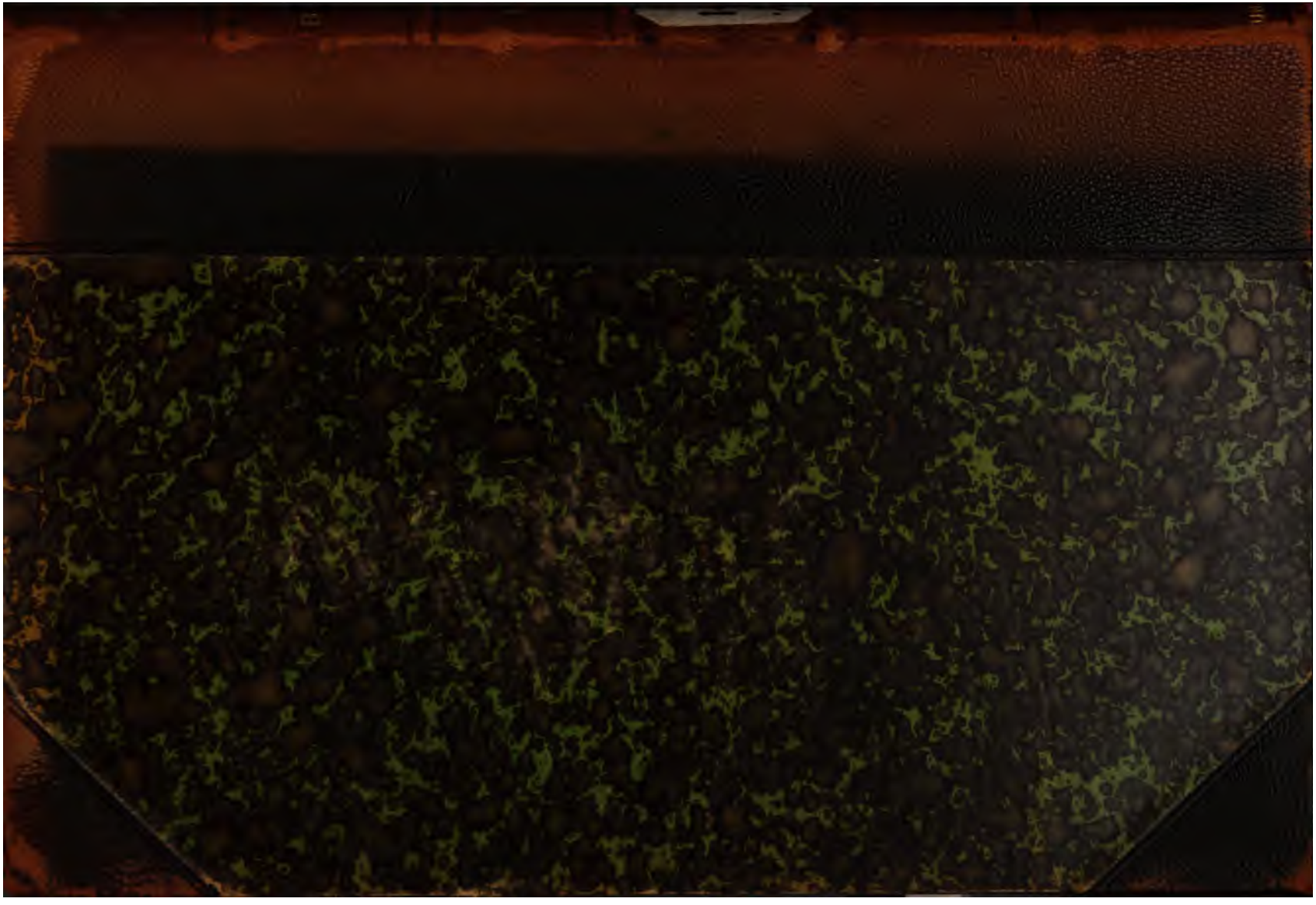
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